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Situated consumer behavior

The impact of bodily influences on decision making

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tot het behalen van de graad
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door

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Daar de proefschriften in de reeks van de Faculteit economie en bedrijfswetenschappen het persoonlijk werk zijn van hun auteurs, zijn alleen deze laatsten daarvoor verantwoordelijk.

The History of Love – Nicole Krauss (2005)
Taken From "Age of Silence"

The first language humans had was gestures.
There was nothing primitive about this language that flowed from people's hands, nothing we say now that could not be said in the endless array of movements possible with the fine bones of the fingers and wrists. The gestures were complex and subtle, involving a delicacy of motion that has since been lost completely.

During the Age of Silence, people communicated more, not less. Basic survival demanded that the hands were almost never still, and so it was only during sleep that people were not saying something or other.

Naturally there were misunderstandings
and yet, because people knew how easily they could happen,
because they didn't go around with the illusion that they understood each other perfectly well, they were used to interrupting each other to ask if they'd understood correctly.

Because of the frequency of these mistakes, over time the gesture for asking forgiveness evolved into the simplest form.
Just to open your palm was to say: Forgive me.

If at large gatherings or parties, or around people with whom you feel distant, your hands sometimes hang awkwardly at the ends of your arms- if you find yourself at a loss for what do with them, overcome with sadness that comes when you recognize the foreignness of your own body- it's because your hands remember a time
when the division between mind and body, brain and heart, what's inside and what's outside, was so much less.

It's not that we've forgotten the language of gestures entirely.
The habit of moving our hands while we speak is left over from it. Clapping, pointing, giving the thumbs-up : all artefacts of ancient gestures. Holding hands, for example, is a way to remember how it feels to say nothing together.

And at night, when it's too dark to see, we find it necessary to gesture on each other's bodies to make ourselves understood.

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Once upon a time…

Sprookjes bestaan niet. Kikkers veranderden nooit in prinsen, van 100 jaar slapen na een speldenprik kan je enkel bekaaid afkomen, en een doctoraat schrijft zichzelf niet, laat staan dat je er lang en gelukkig van leeft. Toch is het achteraf, na vier voorbijgevlogen jaren, niet zo gek moeilijk om gebald in minder dan een boek leesplezier, een pseudosprookje te vertellen…

"Er was eens een meisje dat door een raad van wijzen op pad werd gestuurd. Ze lieten haar zweten op examens en presentaties, op het uitvoeren van experimenteel onderzoek en het neerschrijven van bevindingen. Het werd een boeiende, gevarieerde tocht. Een leger consumenten en marketeers stond klaar om het kleine psycholoogje te vertrappelen, maar kreeg haar niet klein. Een stoffig tot de verbeelding sprekend laboratorium deed haar hoofd bonken, als ze dacht aan de impact van de studenten die er taakjes volbrachten op het al dan niet slagen van haar levenswerk. Geregeld werd ze op aangename missies gestuurd. Ze waande zich prinses in een Duits kasteel in Rauischholzhausen, verkleedde zich in San Francisco, zag krokodillen bij de Everglades en dompelde zich onder in een St-Petersburghiaanse jacuzzi. Ze genoot van het uitzicht in een Rotterdamse skyscraper, en vanop vulkanen in Clermont-Ferrand. Helaas kon ze niet ontsnappen aan in line dancing in Oklahoma, noch aan een Leuvense gang met serre-allures waar ventilatoren op volle toeren sputterden. Aan het einde van het avontuur besloot ze iedereen te bedanken die haar hoofdrol in het verhaal deed verbleken. Ze riep de halve wereld bij zich en vertelde hen dat ze haar euforie over het einde van het avontuur graag wilde delen, en dat het niet half zo leerrijk had kunnen zijn zonder de steun van velen:

Geachte raad der wijzen, bedankt voor jullie ondersteuning en kritische reflecties. Paula, you were there from the start of my internship in CF. The meetings we had, sharing your office, nouveau Beaujolais parties, or dinners in the Mexican restaurant, it was fun from the very beginning until the end, and kept me going through my journey. Your enthusiasm and everlasting belief in good research, cross-cultural friendships, your spirit in life, they appealed me and still strike me. I would grant you an Oscar for best actress in research fairy tales. Thanks for taking care of me in CF. I can only hope that we continue to collaborate once in a while. Siegfried, de energie waarmee je me doorheen de jaren hielp om mijn FWO-voorstel en papers te optimaliseren was verbazingwekkend. De snelheid waarmee je mijn statistische vragen wist op te helderen was verbluffend. Bedankt voor je beschikbaarheid, oog voor detail en rode draad doorheen mijn verhaal. Luk, het was fijn vertoeven in Leuven als jouw doctoraatsstudent. Je bezorgdheid om mijn welbevinden, en het hartelijke ontvangst bij jou en Isabelle thuis gaven me een warm gevoel. De alternatieve verklaringen en onderzoekspistes die je telkens weer uit je geheugen wist op te graven tijdens meetings, een bewonderenswaardige capaciteit, lieten me vaak achter met 500 nieuwe ideeën, eerder dan 1 rechte lijn naar de finish. Maar ik begin te begrijpen dat die zijroutes mijn traject verrijkten, en me een boeiend landschap lieten zien dat ik de komende jaren graag verder wil exploreren. Dirk, mijn verblijf in Rotterdam was allesbehalve te vroeg, want ik heb me onze samenwerking het voorbije jaar nog geen moment beklaagd. Merci om mee je schouders te zetten onder ons project en voor het luisterende oor dat ik er gratis bij kreeg. Marnik en Sabrina, het was een verrijking om jullie van in het begin in mijn commissie te hebben. Jullie kritische, maar verhelderende blik van buitenaf was zeer leerrijk.

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tijdens lunch- en andere pauzes. Pieter, voor je vrolijke noten onderweg. Lien, voor je kijk op het leven en de plezante babbels. Jan en Guy, om me het academische vuur aan de schenen te leggen. Jamie, for being a great roommate. Anouk, Karolien, en Inge, voor het delen van (hotel)kamers en toffe onderonsjes. Maarten, voor de leuke bureau-, en ontbijtmomenten. Bert en Bart, om het nog een jaartje vol te houden zodat we lief en leed tijdens het laatste jaar konden delen. Kobe, om je onderzoeksspirit met me te delen, nooit af te geven en me net dat stapje verder te duwen. Anne and Eesha, I care deeply for our "academic" friendships. I'm glad we met at the EMAC and AMA consortia. Thanks for sharing good and bad times. We'll keep in touch!

Dear Rotterdam crew, and Stijn in particular, thanks for welcoming me "abroad". Yannis, Thomas and Irene, it was fun in your office. Ilona, ons project zetten we zo snel mogelijk weer verder. Het was aangenaam om het samen uit de grond te stampen. Bart, ik ben blij dat we elkaar weer tegenkwamen tijdens ons doctoraat. Je was geregeld een ware boost voor mijn doctoraat. Ik denk met plezier terug aan onze congresbabbels, die me ook in Rotterdam brachten.

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En dan rest er me nog een categorie van mensen die ik met geen goud kan beschrijven. Mams, paps, jullie zijn twee fantastische schatten van ouders, Lante, een meer dan energieke broer. Merci om altijd in me te geloven. Mike, thanks for being around and being my personal translator from time to time. Friends of the nord en vele anderen, maar Arne, Bram, Christine, Mathias, Jan, Sara, en vooral Hanne in het bijzonder, hoe vaak of hoe weinig ik jullie ook zag op café of elders, de warme gloed die ik voel als ik aan jullie denk is immens. Merci om er altijd voor me te zijn. Sprookjes bestaan misschien niet, maar een leven vol avontuur daar teken ik voor. De prins mag in mijn script al eens van zijn witte paard vallen, en is vooral het maatje dat 300% van het doctoraatsavontuur, elke lach of traan mee beleefde, en alle andere vijvertjes mee doorzwemt. Geert, ik ben ervan overtuigd dat we elke oceaan aan kunnen. Dank je wel voor je heldhaftigheid de voorbije jaren. Ik zie je graag omdat je alle kleine en grootse dagelijkse dingen tot 1 groot festijn omtovert. Zonder jou geen missie in mijn leven."

Elk detail in dit verhaal berust op feiten. De namen en gebeurtenissen die werden beschreven zijn niet aan toeval toe te schrijven, maar, in tegendeel, aan jullie aanwezigheid de voorbije jaren. Bedankt daarvoor!

Jiska, op de trein naar Poperinge, augustus 2011.

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GENERAL INTRODUCTION

Why must we seek explanation in either Body or Mind. It is a false dichotomy.

(Gibson, 1979)

SITUATED CONSUMER BEHAVIOR

Ample scientific evidence points to the fact that people are influenced by contextual factors when making decisions. It is now widely accepted that consumers do not always have stable preferences (Bettman, Luce, & Payne, 1998). Rather than being rational (i.e., coherent and consistent over time or across choices) consumers construct different preferences depending on the context (Amir & Levav, 2008; Tversky & Kahneman, 1981). A large variety of, at first sight unrelated, research findings calls attention to these situational effects. The fluency with which information is processed often impacts judgments (for a review, see Alter & Oppenheimer, 2009; Lee & Labroo, 2004; Novemsky, Dhar, Schwarz, & Simonson, 2007; Reber, Winkielman, & Schwarz, 1998). Emotional states of others or oneself can influence consumers' decisions (Darke, Chattopadhyay, & Ashworth, 2006; Griskevicius, Shiota, & Nowlis, 2010; Pham, 1998; Raghunathan & Pham, 1999; Winkielman, Berridge, & Wilbarger, 2005); and so do current goals (Gao, Wheeler, & Shiv, 2009; Van den Bergh, Dewitte, & Warlop, 2008). Even physical experiences have been shown to alter decision making (Hung & Labroo, 2011; Van den Bergh, Schmitt, & Warlop, in press). An overarching framework that helps explain why abstract thinking is affected by such diverse factors is provided by the perspective of *situated cognition*. Although different definitions of situated cognition exist, the general idea is that cognitive processes do not operate apart from the environment, but interact strongly with it (Clark, 1997; Schwarz, 2006b; Smith & Semin, 2007; Wilson, 2002). When consumers decide what (not) to consume, physical, emotional, motivational and other situational factors guide information processing. Hence, if consumers' preferences are constructed at the time of decision making, they are not stable, but vary across contexts (Schwarz, 2006a). Context- sensitive cognition is adaptive in that it allows people to notice problems or opportunities that arise on their way, it allows interference with ongoing thoughts, if necessary (Schwarz, 2006b).

Decades ago, Gibson (1979) advocated that researchers should take an ecological perspective to visual perception. Conceptualizations of the perceptual system should consider the idea that people interact with their environment in perceiving the world. Following the perspective of situated cognition, I would like to argue that, as for visual perception, the environment provides rich sources of information that should be incorporated in our conceptualizations of decision strategies and attitude formations. Gibson has very nicely put into words how the focus of perception should be broadened to the study of a complete human perceptual system in interaction with its environment:

> *"We are told that vision depends on the eye, which is connected to the brain. I shall suggest that natural vision depends on the eyes in the head on a body supported by the ground, the brain being only the central organ of a complete visual system" (Gibson, 1979, p1)*

In an effort to conceptualize our research findings within the framework of situated cognition, I sketch three core ideas of this approach, suggested by Robbins and Aydede (2008): cognition is embedded, embodied and extended. The three essays in this dissertation defend the ideas of embedded and embodied cognition. Before turning to an overview of the essays, I define the building blocks of situated cognition, and discuss theories and research findings of embodied cognition in particular, to develop an overall picture of our theorizing.

1. Embedded cognition: thinking is for the sake of action, and therefore cognition always builds on interactions between an actor and the world. For example, a tall person will prefer another chair to sit on than a shorter person. It has been shown that people are remarkably accurate in estimating the instrumentality of their environment (Ishak, Adolph, & Lin, 2008; Mark & Vogele, 1987; Warren, 1984). How comfortable a chair is, is not a given, but rather an online constructed belief based on characteristics of both the perceiver and the object.

2. Embodied cognition: perceptions, actions and introspective states are the building blocks of information processing (Barsalou, 1999; Damasio, 1989; Gallese & Lakoff, 2005; Glenberg, 1997; Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005). It is argued that thinking cannot rely on symbols that provide meaning by simply referring to other meaningless symbols (Harnad, 1990), but that meaning can only be provided by a bottom-up sensory approach in which symbols are grounded in the original objects and bodily states.
3. Extended cognition: thinking can be offloaded to the environment to save mental capacity. For example, finger counting strategies can be used for numerical representations (Brozzoli, et al., 2008; Di Luca, Granà, Semenza, Seron, & Pesenti, 2006). Similarly, knowledge can be spread over different individuals, who can be consulted or "plugged in like an external hard drive onto one's own mind" (Clark & Chalmers, 1998; Thompson & Fine, 1999).

EMBODIED COGNITION

Embodied cognition is inspired by William James' view on the interdependence of bodily sensations, feelings and thoughts (1890). As James stated, *"no mental modification ever occurs which is not accompanied or followed by a bodily change (p5)."* Here is a thought experiment. When confronted with a bear, we might consciously tell ourselves that we should feel anxious, watch out and ready ourselves to flight. It would be more adaptive however if our cognitive system does not make abstraction from inputs it receives from the outer world, but constantly interacts and feeds back to emotional and bodily states. Luckily this is exactly how cognition works. When confronted with a bear, we feel our heart beat, focus all our attention on the threatening bear, and our muscles ready themselves to run away. All these changes are intertwined,

or with James' words *"without the bodily states following on the perception, the latter would be purely cognitive in form, pale, colorless, destitute of emotional warmth (p450)."*

Embodiment theories argue that mental simulations of original bodily states are the core of knowledge representation (Barsalou, 2008). For example, when thinking about happiness, the zygomaticus major, or the muscle that turns lips into a smile, is contracted (Niedenthal, 2007; Niedenthal, Winkielman, Mondillon, & Vermeulen, 2009). When seeing a smile on someone's face, in order to interpret its meaning, several brain regions may be activated (e.g., reward centers in the prefrontal cortex to activate associated attachment information, the amygdala for its role in motivation detection, and motor regions responsible for mimicry) (Niedenthal, Mermillod, Maringer, & Hess, 2010). Thus, rather than representing the meaning of, for instance, an enjoyment smile as one abstract amodal symbol, different modalities of the brain co-operate in representing and reactivating information (Barsalou, 1999). Most embodiment theories specify mental simulations on the level of the brain, but simulations can even spread to muscular activity and bodily sensations like heartbeat and arousal. Research about action- and emotion processing has been particularly fruitful in showing that similar brain regions, or muscles react to actually experiencing and remembering, imagining, perceiving or reading about an event (Beilock, Lyons, Mattarella-Micke, Nusbaum, & Small, 2008; Foroni & Semin, 2009; Glenberg & Kaschak, 2002; Niedenthal, et al., 2009; Pulvermüller, 2005; Rizzolatti & Craighero, 2004; Speer, Reynolds, Swallow, & Zacks, 2009; Wicker, et al., 2003).

Embodiment theories also argue that bodily states can accommodate abstract concepts, like power, or love (Boroditsky & Prinz, 2008; Niedenthal, Eelen, & Maringer, 2011). Metaphors suggest that the abstract world is conceptualized physically (Lakoff & Johnson, 1980). People describe abstract ideas in concrete terms. For example, the

abstract notion of valence (i.e., positivity) has been shown to be grounded in perceptual dimensions such as brightness (i.e., good is bright and bad is dark, Meier, Robinson, Crawford, & Ahlvers, 2007) and auditory pitch (i.e., high pitch sounds mean good things) (for a review, see Crawford, 2009). Not only do people have linguistic expressions for abstract concepts, perceptual experiences seem to represent them. Take for instance the concept of power as an illustration. Children experience the fact that most powerful people are taller than they are. Hence, one important and common feature that accompanies the experience of social power is the perception of differences in vertical space. Indeed, it was found that mental representations of power include spatial location information with powerful being up and powerless being down (Schubert, 2005). Another example is that the activation of the anterior insula underlies both the physical sensation of warmth (Craig, Chen, Bandy, & Reiman, 2000) and psychological sensations of warmth like feelings of social exclusion, trust, and empathy (Carr, Iacoboni, Dubeau, Mazziotta, & Lenzi, 2003; King-Casas, et al., 2008; Rilling, et al., 2008; van den Bos, van Dijk, Westenberg, Rombouts, & Crone, 2009).

If emotions, actions and perceptions form the basis of how knowledge is represented, then it is not surprising that bodily states experienced at the moment of information processing 'color' decision making. Experiencing physical coldness decreases prosocial behavior (IJzerman & Semin, 2009; Williams & Bargh, 2008). Stepping backwards leads to stronger focus on what is relevant in a given situation (Koch, Holland, Hengstler, & van Knippenberg, 2009). When participants were unobtrusively induced to contract the zygomaticus major, or the smiling muscle, they found cartoons more funny (Strack, Martin, & Stepper, 1988). Receiving feedback about an achievement task in an upward posture made participants feel more proud than in a slumped posture (Stepper & Strack, 1993). Carrying a heavy clipboard made the topic of the survey seem more important (Jostmann, Lakens, & Schubert, 2009). Moreover, recent research shows that consumer decisions can also be affected by body feedback.

Nodding the head, as when agreeing, while watching positively valenced products, increased positive attitudes towards these products compared to shaking the head (Förster, 2004). When flexing arms, people become more reward seeking than when people stretch arms, because flexion of arms is associated with approaching positively valenced stimuli (Van den Bergh, et al., in press). Hence consumers who shop by carrying a shopping basket (i.e., arm flexion), bought more vices at the cashier desk than consumers who shop by pushing a shopping cart (i.e., arm extension). In a study by Hung and Labroo (2011), it was found that students who had a health goal and held a pen firmly in their hand while buying a snack for lunch were more likely to resist unhealthy temptations than when they were holding the pen loosely, suggesting that when making a fist, people exert more willpower. These illustrations highlight that body feedback can alter, facilitate or interfere with information processing.

In the studies presented in this dissertation, I will demonstrate effects of situated cognition. More specifically, together with my co-authors, we investigate how body feedback affects product evaluations and choices, and feelings of power. The underlying assumption is that the environment and bodily states are incorporated in consumer decision making. In the first essay we demonstrate that easy-to-grasp products, as manipulated by the orientation of product handles, are more attractive than difficult-to-grasp products and investigate the context-dependency of simulating actions. In the second essay, we focus on how doing things differently increases novelty seeking among consumers. Finally, in our last essay we explore the different meanings of crossing the arms in front of the body and show that dependent on prior feelings of self-worth, arm crossing can reduce or increase feelings of power. In an introduction to each essay, I highlight the embedded and embodied nature of our research findings.

INTRODUCTION TO ESSAY 1

Embodied cognition suggests that motor behavior related to products that consumers interact with is mentally represented. The theory also suggests that this motor behavior is reactivated if consumers think about products. Indeed, neurological evidence has shown that the left ventral premotor cortex, which is active while performing actions, was also activated when naming tools (Chao & Martin, 2000). Behavioral paradigms – e. g., by means of response latencies – have been used to show that both grasping actions for picking up objects and more functional actions related to the intentional use of objects are activated during information processing about these objects (Bub, Masson, & Cree, 2008; Tucker & Ellis, 1998). Additionally, research about processing fluency indicates that fluently processed stimuli are judged more positively (Alter & Oppenheimer, 2009). Therefore, when it feels easier to interact with a product, this may increase the attractiveness of the product. We hypothesized that right-handers would prefer products with product handles oriented rightwards, because these are easy-to-grasp with the dominant right hand.

Importantly, we theorize that feelings of fluency can result from two types of body feedback. The first is that people simulate possible actions with objects and experience fluency when a well-learned action can be mapped on what is perceived. This simulation process relies heavily on the perceiver's automatic bodily reactions. It is a quick, effortless simulation process based on a learned grasping pattern. The other simulation process is more embedded in the environment, or driven by the interaction between perceiver and situational cues: a feeling of fluency can arise when a biomechanically efficient action is mapped on what is perceived. For instance, when actions with the right hand are prevented, even right-handers may prefer products with handles oriented leftwards. This process is more cognitively demanding, because it asks for a comparison

of all possible actions with objects based on what the body and the product permit at the time of observation.

In four studies we find evidence that people prefer easy-to-grasp products. Right-handers prefer products with handles oriented rightwards over products with handles oriented leftwards. Additionally, we show that the automatic simulation process occurs for rigid right-handers: when mentally taxed and other decision strategies do not overrule the feeling of fluency, they have a preference for rightly-oriented products. Conversely, flexible right-handers scan the environment actively for action cues to detect how the body and object map, which is mentally effortful, and show a preference for rightly-oriented products when mental resources are not taxed. As flexible right-handers rely more heavily on situational cues, they have a preference for products with leftwards handles (i.e., reversed) when making use of the left hand.

INTRODUCTION TO ESSAY 2

In our second essay, we investigate how deviations from common experiences trigger openness to new experiences. In times of change, consumers seem to move away from their favorite products, and choose unfamiliar products instead (Wood, 2010). Research about habitual thinking has shown that people with strong habits detect fewer changes in the environment and search less for alternative actions (Verplanken, Aarts, & van Knippenberg, 1997). As it is easier to change habits in new environments (Wood, Tam, & Guerrero Witt, 2005), it is possible that novel behavior leads to a mindset of openness to change. However a more specific prediction follows from research about curiosity. Novelty is arousing and leads to exploration (Berlyne, 1950). Therefore we hypothesized that performing actions in novel ways should increase explorative consumption, or novelty seeking.

Four studies demonstrate that unusual actions amplify exploration, even if the triggering actions are trivial and irrelevant to the choice context. First of all, consumers' need for uniqueness (Tian, Bearden, & Hunter, 2001), or the interest in buying and combining unconventional and innovative products in order to express one's uniqueness, is increased by performing an unusual action. Unusual actions also make people more likely to choose uncommon and new products. We rule out several alternative explanations for these findings. The embedded nature of cognition is highlighted in this essay, because we show that new circumstances are incorporated in ways of thinking. Engaging in novel behavior leads to exploration more than usual behaviors do. Furthermore, we show that people are good at ignoring contextual cues in their judgments when they are aware of the incidental character of novelty in the environment.

INTRODUCTION TO ESSAY 3

Many body postures and movements have been shown to affect decision making. For example, arm flexion is associated with approach, and arm extension with avoidance; and inducing these movements impacts preference construction (Cacioppo, Priester, & Berntson, 1993; Förster, 2003; Van den Bergh, et al., in press). Most often embodiment research has focused on main effects of body postures on behavior and decision making (but see, Schubert, 2004). However given the situated nature of cognition, we hypothesize that not all bodily states lead to similar behavioral effects for all consumers. Every individual has a different lifetime of experiences that may be of influence for decision making. At first sight very similar bodily states may have different meanings. For instance, smiling may be an instantiation of dominance, masking, enjoyment, or affiliation (Ekman & Friesen, 1982; Niedenthal, et al., 2010). Its contingency in appearance with other bodily states (e.g., presence or absence of eye

contact, crow's feet, erectness of posture, etc.) or situational cues may reveal its true meaning.

In this essay, we study arm crossing and its different meanings and effects on feelings of power and reliance on contextual cues. Crossing the arms in front of the body is often seen as an expression of low power, but also of defensiveness and unyielding (Argyle, 1988; Bull, 1987; Carney, Cuddy, & Yap, 2010; Gifford, 1994; Huang, Galinsky, & Gruenfeld, 2011). We propose that arm crossing activates defensiveness or unyielding dependent on feelings of self-esteem. People with high self-esteem feel more in control of situations than people with low self-esteem (Judge, Erez, Bono, & Thoresen, 2002), and feeling in control leads to psychological reactance against persuasion attempts, whereas feeling out of control increases conformity with persuasion attempts by others (Biondo & MacDonald, 1971). Hence, we suggest that arm crossing lowers feelings of power and increases reliance on contextual cues for people with low self-esteem, because the posture has a high chance of activating defensiveness. Conversely, we suggest that arm crossing will increase feelings of power and decrease reliance on contextual cues for people with high self-esteem, because the posture is most likely to be associated with unyielding.

We show the predicted pattern of results on power feelings and show that reduced feelings of power lead to greater reliance on contextual cues. Finally, we discuss the gap between people's perceptions of effectiveness of arm crossing (i.e., protection against persuasion attempts) and actual impact on behavior.

ESSAY 1

Two Routes to Motor Fluency: When Ease of Grasping Affects Product Evaluation and Choice

ABSTRACT

We investigate how flexible and rigid right-handers' product evaluations and choices are differently impacted by orientation cues. Two types of body feedback cause a preference for easy-to-grasp products . First, experiencing motor fluency can result from scanning the environment for cues that indicate how to interact with the world. We show that flexible right-handers pay more attention to situational constraints than do rigid right-handers and show a preference for products that are biomechanically most efficient to grasp. Additionally, distraction from orientation cues attenuates the effect. Second, experiencing motor fluency can result from an automatically activated well-learned grasping tendency, as we find for distracted rigid right-handers. This research highlights the importance of actions in preference construction and underscores the flexible and situated nature of cognition.

Keywords: embodiment, situated cognition, handedness, processing fluency, product orientation, grasping

INTRODUCTION

Have you ever noticed that most bottled detergents on supermarket shelves are oriented with their handle towards the right of the brand label? The reason for this is that we live in a right-handed world, designed by and created for right-handers. About 90% of the world population is right-handed (Perelle & Ehrman, 1994). Orientation cues, like the right-handed handles of bottled detergents, are traces of handedness in our product universe. An important but unanswered question is whether these orientation cues have an impact on preference construction. Physical actions may steer our mind, such that presenting products in line with how one would grasp them may increase their likeability. In support of this notion, Ping, Dhillon and Beilock (2009) found preliminary evidence that right-handers prefer tools with the handle oriented rightwards to tools with the handle oriented leftwards. They called this phenomenon the motor fluency effect.

However, not all right-handers are exclusively right-handed (Annett, 1972). Some right-handers tend to use their right hand more rigidly than others. For example, while right-handers most often use their right hand to pick up pieces when making a puzzle, actual proportions vary from slightly over 50% to almost 100% of all grasps. Rigid right-handers use their right hand almost exclusively in contralateral space, but more flexible right-handers can switch easily to their left hand (Gonzalez & Goodale, 2009; Gonzalez, Whitwell, Morrissey, Ganel, & Goodale, 2007). Diversity in hand preference may have important implications for the influence of orientation on product evaluations. Flexible right-handers are biomechanically more efficient (Bryden, Pryde, & Roy, 2000), but may spend more cognitive resources on planning actions than rigid right-handers. Flexible right-handers' attention to orientation cues may then feed into their preference construction. The main contribution of this paper is to increase understanding of the motor fluency effect, and to demonstrate the important moderating influence of

handedness flexibility. We specifically investigate how flexible and rigid right-handers' decision making processes, like product evaluation and choice, are differently impacted by orientation cues. We examine the processes that underlie motor fluency and explore how degree of right-handedness influences the use of orientation cues in decision making processes.

Hypothesis development

An increasing amount of research indicates that bodily sensations are a fundamental part of human cognition (Barsalou, 1999, 2008; Niedenthal, Eelen, & Maringer, 2011). Theories of embodied cognition highlight that people's experiences constitute a set of perceptions, emotions and actions that are stored in memory and form the basis for subsequent thought (Barsalou, 1999; Gallese & Lakoff, 2005). In addition, the ease with which consumers can process (information about) stimuli affects their attitudes towards these stimuli (Lee & Labroo, 2004; Mandler, Nakamura, & Van Zandt, 1987; Novemsky, et al., 2007; Reber, et al., 1998), such that fluent processing leads to higher likeability. When consumers shop in a store, physical features of products are salient. Hence, the ease with which products are grasped, could lead to an increase in attractiveness. Alter and Oppenheimer (2009) stipulated that body feedback is an instantiation of embodied cognitive fluency. The concept of motor fluency was developed by Beilock and colleagues as a new source of fluency to emphasize the functional links between cognition and action (Beilock & Holt, 2007; Yang, Gallo, & Beilock, 2009). For example, expert typists prefer letter combinations that are easy to type, even when no motor behavior is involved, whereas novices do not show such preferences (Beilock & Holt, 2007). Motor fluency relies on evidence that observing a stimulus leads to covert simulation of actions that are associated with the stimulus. Such simulations can provide feedback about the ease or fluency of action and influence evaluations of objects. Product preferences could be directly influenced by the affective nature of processing fluency

(Schwarz, 2004). Hence, in line with Ping et al.'s finding (2009), we hypothesize that in a shopping context right-handers will prefer products with a handle oriented rightwards to products with a handle oriented leftwards.

H1: Right-handers prefer products with a handle oriented rightwards over products with a handle oriented leftwards.

We further theorize that feelings of fluency can result from two types of body feedback. We elaborate on these two mechanisms and describe how they are related to flexibility of handedness.

First, when people simulate possible actions with objects, they may experience fluency when a well-learned action can be mapped on what is perceived. This mechanism, as implicitly suggested by Ping et al. (2009), follows directly from automatic motor simulation of acting on objects. Behavioral and neuropsychological studies have shown that merely seeing a product activates an action tendency to manipulate it (Chao & Martin, 2000; Tucker & Ellis, 1998, 2004). Additionally, if a product is presented in line with previous experiences, it is easier to process and recognize (Helbig, Graf, & Kiefer, 2006). Some right-handers have a stronger tendency than others to perform actions with the right hand (Bryden, et al., 2000). Thus, our body, and more specifically handedness, determines what is easy or difficult to grasp. Following this reasoning, it seems plausible that rigid right-handers experience motor fluency when objects are oriented with the handle rightwards, more than flexible right-handers do. This would result from a lifetime of grasping experiences with the highly preferred right hand, and a largely bodily driven simulation process.

The second mechanism that we put forward is that, when people simulate possible actions with objects, the experience of fluency may arise if a biomechanically efficient action can be mapped on what is perceived. In addition to motor simulation, people may have to scan the environment for cues that permit grasping. Motor fluency

involves the (imagined) physical interaction between consumers and products. Bodily constraints and product features reveal together how objects can be used (Gibson, 1979; Mark & Vogele, 1987). Therefore, from the perspective of situated cognition (Schwarz, 2006b; Smith & Semin, 2004; Wilson, 2002) arguing that thinking is for doing (James, 1890), we assume that flexible right-handers rely more heavily on situational constraints for planning actions, and hence might need to process information about orientation cues more deeply than do rigid right-handers. Thus, if not only body-specific, but also product-specific characteristics, and connections between the two may play a role in the emergence of motor fluency and hence preference construction, then flexible right-handers may show a stronger motor fluency effect than rigid right-handers. This mechanism implies that flexible right-handers pay more attention to orientation cues in their environment than rigid right-handers, and that they would prefer products with a handle oriented leftwards, if this orientation is biomechanically more efficient. This would however not affect preference construction of rigid right-handers, because their hand preference is not driven by biomechanical efficiency.

H2: Flexible right-handers pay more attention to orientation cues than rigid right-handers.

H3: Left-handed actions switch flexible right-handers' preference to products with a handle oriented leftwards, whereas left-handed actions do not influence preference construction for rigid right-handers.

We do not specify beforehand whether flexible or rigid right-handers show stronger motor fluency effects, because we have outlined two different types of body feedback that can lead to experiences of motor fluency and it is difficult to predict which of both mechanisms will lead to stronger effects. However, distraction should have opposite effects on preference construction for rigid and flexible right-handers. According to the first mechanism, the mental simulation is effortless and quick. Thus, it

can easily be overruled by more cognitive processes. This leads to the prediction that rigid right-handers will especially show a preference for products with a handle oriented rightwards when mentally taxed. On the other hand, the simulation process of flexible right-handers seems more demanding, because it asks for a comparison of all possible actions with objects based on what the body and the product permit at the time of observation. Therefore, we hypothesize that if mental resources are limited and environmental cues cannot be taken into account, the motor fluency effect will not occur for flexible right-handers.

H4: Distraction increases rigid right handers' preference for products with a handle oriented rightwards but reduces flexible right handers' preference for products oriented rightwards, compared to products with a handle oriented leftwards.

Overview of studies

In four studies we investigate how handle orientations affect right-handers' evaluation of products. In the first study we focus on the main effect of motor fluency (hypothesis 1). In Study 2, we examine to what extent flexible and rigid right-handers pay attention to orientation cues (hypothesis 2). In Study 3, we test if left- and right-handed actions have a different impact on preference construction by flexible and rigid right-handers (hypothesis 3). Finally, Studies 3 and 4 focus on the effect of degree of right-handedness and distraction (hypothesis 4 and 5) on preferences for easy-to-grasp products.

STUDY 1

Study 1 aims to establish the motor fluency effect. We hypothesize that the orientation of product handles has an impact on choice. We go beyond Ping et al.'s findings (2009) by creating a choice task in which participants choose between objects of

the same product category. We predict that when right-handers are given the choice between a product oriented with its handle leftwards and one oriented rightwards, products with rightward handles will be preferred over products with leftward handles.

Method

Participants. Participants were 28 university students (17 male) between 17 and 31 years old (M = 20.72, SD = 2.81). All students were recruited from an online subject pool and participated to receive partial course credit. Participants were prescreened to be right-handers. Handedness was determined by the hand with which a person writes (Perelle & Ehrman, 2009).

Procedure. Participants were tested individually and were unobtrusively videotaped during the session. They sat behind a table, with a shopping basket on the chair at their right side. Each trial started with a screen that was put on the table by the experimenter in order to prevent participants from viewing the placement of products. Next, the experimenter put two similar products (e.g., two pizza cutters) on the table in one of the four possible configurations (see Figure 1.1). Participants were asked to choose as quickly as possible, once the screen was taken away, which of both products they would prefer to use. They indicated their choice by grasping the product they preferred with their right hand and put it in the shopping basket. The experimenter registered their choice and installed the screen for the next trial. At the end of the session, participants were asked to write down all their decision rules for making choices and to guess the purpose of the study. The videotapes were used afterwards for double checking the coding of choices.

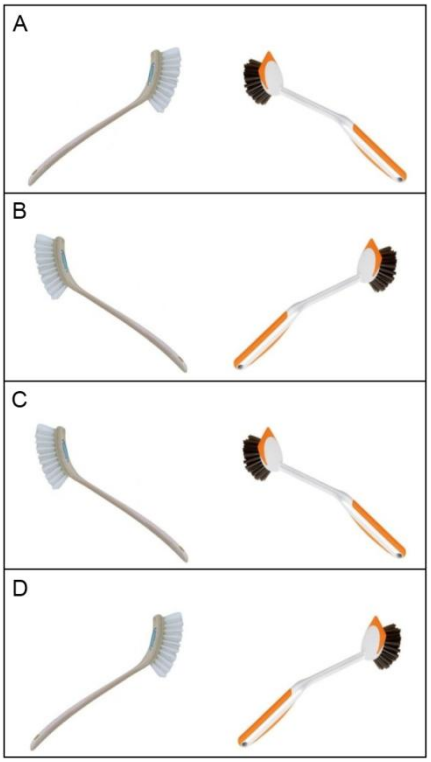

Figure 1.1. Four possible configurations of easy- and difficult-to-grasp products. A and B represent target trials in which a conflict in ease of grasping is induced, whereas C and D are filler trials.

Materials. Each participant saw 32 pairs of products (see Appendix). All pairs of products were utensils for cooking (e.g., measuring cups), gardening (e.g., spades), hygiene (e.g., toothbrushes) and other home purposes. In 16 target trials, product pairs were shown with the handle of both products pointing in opposite directions. One product was oriented with its handle towards the right (i.e., an angle of 135°) , whereas the other product was presented with its handle towards the left (i.e., an angle of -135°). Products with handles oriented rightwards (vs. leftwards) are easy-to-grasp with the right (vs. left) hand. In half of all target trials the product oriented rightwards was shown on the right side of the table (See A in Figure 1.1) and in the other half on the left side (B, in Figure 1.1) (counterbalanced across participants). In eight filler trials, participants had to choose between two products without handles (e.g., two vases). In the other eight filler trials, product pairs were shown with both handles in the same direction (i.e., four times

rightwards, and four times leftwards, see C and B in Figure 1.1). The order of trials was counterbalanced over participants.

Results and discussion

For each participant, we created a percentage score indicating, for the 16 target trials, how often participants had chosen the easy-to-grasp product (i.e., the product oriented rightwards). Participants mentioned aspects like color and design for their evaluation, but none of them brought up product orientation (similar in all studies). One participant guessed the purpose of the study and was removed from further analyses. One outlying observation was removed, because it lay outside of the interquartile range (Tukey, 1977). However, analyses led to similar results if the outlier or suspicious participant were included. In all studies of this paper, we conducted a similar outlier analysis that we only report when outliers were detected. Overall, participants preferred easy-to-grasp products over difficult-to-grasp products (M = 57.25%, SE = 2.21%) which differs significantly from a random choice pattern ($t(25) = 3.28$, $p = .003$). These findings show that right-handers prefer easy-to-grasp products to difficult-to-grasp products. These results thus replicate the study by Ping et al. (2009), in which participants were asked to actively pick up the product they preferred. One could argue that the act of grasping itself played a pivotal role in these findings. Studies 3 and 4 are designed as online environments to test if the motor fluency effect occurs without the need to grasp products. First, in Study 2, we test how flexible and rigid right-handers differ in how they process information about orientation cues.

STUDY 2

In this study we examine if right-handers differ in the extent to which they pay attention to situational constraints. By definition, the more one is strongly right-handed, the more one manipulates objects exclusively with the right hand. Rigid right-handers

are less flexible in switching hands while interacting with their environment and manipulate objects with the dominant right hand, while more flexible right-handers are sensitive to situational constraints when choosing which hand to use (Gonzalez & Goodale, 2009). In this study we seek to find more evidence for the proposition that flexible right-handers pay more attention to orientation cues than rigid right-handers. We predict that, after being exposed to different products with handles, flexible right-handers will recall the orientation of product handles better than rigid right-handers. Degree of handedness can be measured by means of performance measures (e.g., peg moving, Annett, 1976; (precision) grasping, Bryden, et al., 2000; grip strength, Gonzalez & Goodale, 2009) or hand preference questionnaires (e.g., Oldfield, 1971). For right-handers these measures are highly correlated (Brown, Roy, Rohr, & Bryden, 2006). Here, degree of handedness is measured by a hand preference questionnaire about the products presented in the study.

Method

Participants. In return for monetary compensation 60 university students (26 male) were recruited from a subject pool to participate in this study and several other unrelated studies. All participants were between 19 and 32 years old (M = 21.93, SD = 2.04) and prescreened to be right-handers (see Study 1).

Procedure. Participants watched a presentation of 24 products on a computer screen and were told that questions about the products would follow afterwards. Twelve target products had a handle oriented rightwards (i.e., six products with an angle of 135°) or leftwards (i.e., six products with an angle of -135°) and 12 filler products had no handle. The presentation of target and filler products was randomized, with the restriction that target and filler trials were alternated and no more than three subsequent target trials had a similar handle orientation. Handle orientation of products was randomized across participants. Subsequently, participants performed a cued recall task

in which they were asked to reproduce the orientation of the handle of the target products (i.e., a binary choice, leftwards or rightwards) and to indicate their certainty for each answer on a 6-point scale (from *50% = not certain at all, just guessing* to *100% = absolutely certain*). Finally, participants reported on a 5-point scale (1 = *always with my left hand* and 5 = *always with my right hand*) which hand they would use for manipulating the 12 target products presented in the first phase.

Results and discussion

To create an overall performance measure for each participant, orientation answers of all 12 target products were coded for correctness (i.e., 0 is incorrect, 1 is correct), multiplied by their level of certainty and aggregated. Degree of right-handedness[1] resulted from aggregating the handedness scores of the target products (Cronbach's α = .81). Two participants indicated in the debriefing that during exposure to the products, they explicitly tried to memorize the orientation of the handles. These observations were excluded from further analyses but did not affect statistical results. We found a significant negative correlation between participants' degree of right-handedness and performance (r = -.34, p = .01; without correction for uncertainty: r = -.26, p < .05). Both left (r = -.29, p = .03) and right orientations of handles (r = -.28, p = .04) accounted for this result. This indicates that flexible right-handers perform better on the task and hence seem to pay more attention to orientation cues in their environment than rigid right-handers.

STUDY 3

In Study 2 we demonstrated that flexible right-handers paid more attention to orientation cues. Hence, in this study we examine the processes behind motor fluency.

[1] In all studies where degree of handedness was measured, participants scored between 3 and 5, indicating that all right-handers indeed showed a preference for manipulating objects with the right hand.

We measure degree of right-handedness and manipulate whether products are chosen with the right or left hand. We predict that flexible right-handers will rely on situational constraints and show a preference for products oriented rightwards when using the right hand, but a reversed preference for products oriented leftwards when using the left hand. For rigid right-handers, we predict a preference for products oriented rightwards, no matter the hand used. The design of this study is similar to Study 1, but we make use of a computerized task. Pictures of products are clearly not graspable, but nonetheless previous research has shown that mental simulation of grasping also occurs in response to images of products (Tucker & Ellis, 1998).

Method

Participants. In return for monetary compensation, 67 university students (16 male) were recruited from a subject pool to participate in this study and several other unrelated studies. All participants were between 18 and 24 years old (M = 20.78, SD = 1.49) and prescreened to be right-handers (see Study 1).

Procedure and materials. Participants sat in partially enclosed cubicles which prevented them from having contact with each other. They were shown pairs of similar products (i.e., utensils for cooking, hygiene, and other home purposes) on a computer screen. In each trial participants were asked to choose as quickly as possible which product they preferred to use. Participants were randomly assigned to using the left hand or right hand for making choices. They indicated their answer by tapping on the letter "D" on the keyboard if they preferred the product presented on the left side of the screen or tapping on "K" if they chose the product on the right side. The design of this study was similar to that of Study 1. In eight target trials, the handles of the two products pointed in opposite directions (i.e., products oriented rightwards in an angle of 100°, and products oriented leftwards in an angle of -100°). In half of these trials the product oriented rightwards was shown on the left side of the screen, whereas in the other half it

was shown on the right side. In four filler trials the handles of the products were oriented in the same direction (twice leftwards, and twice rightwards) and four other filler trials consisted of product pairs without handles. We randomized whether items of product pairs were presented on the left or right side of the screen, and order of trials within participants. All product pairs with handles were randomly selected to be target or filler trials. After the choice task, participants were asked to write down their thoughts when deciding which products to choose, and to guess what the study was about.

Degree of right-handedness. Among other unrelated studies following the choice task, participants completed the handedness scale (for a discussion of this measure, see Curt, Mesbah, Lellouch, & Dellatolas, 1997) in which they reported on a 5-point scale (1 = *always with my left hand* and 5 = *always with my right hand*) which hand they would use for manipulating 12 different objects (e.g., use a spoon, tennis racket).

Results and discussion

Two participants (i.e., one from each hand condition) correctly guessed the purpose of this study and were removed from further analyses. These removals did not affect statistical results. For each participant we created a percentage score indicating how often products oriented rightwards were chosen in the eight target trials. We conducted a GLM analysis on the percentage scores with hand used (left vs. right) and degree of right-handedness as independent between-subjects variables. A main effect of hand use emerged ($F(1, 61) = 13.10$, $p = .0006$) indicating that on average, participants who used the right hand chose products oriented rightwards more frequently (53%, SE = 2%) than participants using the left hand to indicate choices (43%, SE = 3%). There was no main effect of degree of right-handedness ($F < 1$). Most important however was the significant interaction effect of hand used and degree of right-handedness ($F(1, 61) = 12.10$, $p = .0009$) (see Figure 1.2). As expected, simple effects analyses, in which

estimated values were compared with a random choice pattern (i.e., 50%), revealed that flexible right-handers ($M_{right\text{-}handed}$ - 1SD) who used the right hand for making choices had a preference for products oriented rightwards (61%, SE = 3%, $t(64) = 3.15$, $p = .003$), whereas flexible right-handers who used the left hand had a preference for products oriented leftwards (37%, $SE = 5\%$, $t(64) = -2.94$, $p = .005$). This indicates that preference construction for flexible right-handers is affected by situational constraints. On the other hand, rigid right-handers ($M_{right\text{-}handed}$ + 1SD) did not show a preference for products oriented rightwards (or leftwards), neither with the right hand (46%, $SE = 3\%$, $t(64) = -1.16$, $p = .25$) nor with the left hand (50%, $SE = 4\%$, $t(64) = .03$, $p = .97$). Slopes analyses indicate that more flexible right-handers show stronger motor fluency effects than rigid right-handers, both with the left hand ($\beta = -24$, $t(64) = -2.06$, $p = .04$) as with the right hand ($\beta = 27$, $t(64) = 3.03$, $p = .004$).

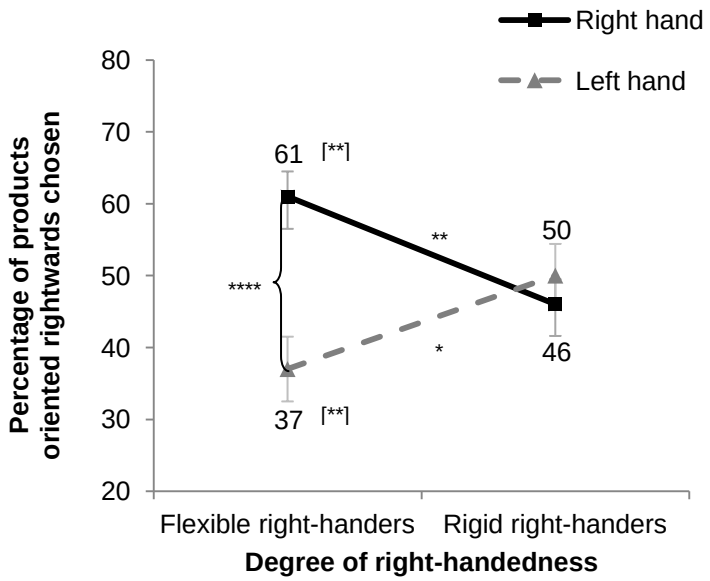

Figure 1.2. Percentage of products with a handle oriented rightwards chosen, as a function of degree of right-handedness and hand used to make choices.
Note. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$, $^{****}p < .0001$. Significances between brackets indicate to what extent values differ from a random choice pattern (i.e., 50%).

The findings of Study 3 suggest that flexible right-handers are affected by the orientation of product handles in constructing preferences, whereas rigid right-handers are not. More specifically, we forced participants to indicate their choices with either the left or right hand and found that flexible right-handers preferred products oriented leftwards when using the left hand to indicate choices and vice versa for the right hand. This pattern of findings clearly indicates that flexible right-handers process orientation cues and match these cues with what the body permits at the time of decision making. We did not find evidence for the mechanism that rigid right-handers have a preference for products oriented rightwards. However as we stated in the introduction, it is possible that this process is easily overruled by more cognitive decision making rules. Therefore in Study 4, we test if distraction inhibits the occurrence of the motor fluency effect for flexible right-handers and enhances the effect for rigid right-handers.

STUDY 4

Study 4 has four major objectives. First, we seek to replicate the findings of Study 3 for undistracted flexible and rigid right-handers. Second, we test the impact of distraction on the preference for easy-to-grasp products for flexible and rigid right-handers. Third, participants are not asked to perform any grasping-like movements towards products or towards the keyboard while looking at products in order to demonstrate that our findings are not driven by explicit motor activations. Because motor behavior is by no means restricted in this study, we expect flexible right-handers to have a natural preference for products oriented rightwards. Finally, participants are asked to rate the attractiveness of one product, rather than to choose between product pairs, to test if the motor fluency effect is due to the observed conflict in ease of grasping or due to the inherent ease or difficulty-of-grasping of each individual product.

Method

Participants. In return for partial course credit, 106 university students (64 male) were recruited. All participants were between 18 and 23 years old (M = 19.25, SD = 1.30) and prescreened to be right-handers (see Study 1).

Procedure and materials. As in Study 3, participants sat in partially enclosed cubicles and all instructions were presented on a computer screen. Participants were told that they were about to see the image of a product as it would be used in an advertising campaign for the product, and answer some questions about the product afterwards. Then we informed them that they would have to memorize a number while observing the product to simulate a distracting real-life situation in which people encounter advertisements. We told them that people often think of other things when exposed to advertisements. Our manipulation of distraction has frequently been used in the literature (Gilbert, Giesler, & Morris, 1995; Nowlis & Shiv, 2004; Shiv & Fedorikhin, 1999). In the "low distraction" condition participants were requested to memorize the 2-digit number '75'. The other half of participants in the "high distraction" condition were asked to memorize the 9-digit number '753293142'. Then the advertisement task started in which a designer water boiler was shown for 5 seconds. Half of all participants were shown the water boiler with its handle oriented rightwards ("easy-to-grasp condition"). The other half saw the boiler with its handle oriented leftwards ("difficult-to-grasp condition"). Following this presentation, participants were asked to indicate how attractive they considered the water boiler on a visual analogue scale ranging from *not attractive at all* to *very attractive* (200 points). Subsequently they were asked to report the number they had memorized. Finally, after several filler tasks, participants indicated which hand they would use for manipulating a water boiler on a 5-point scale (ranging from 1 = *always with my left hand* to 5 = *always with my right hand*).

Results and discussion

Six participants (all from the high distraction condition) could not recall the correct digit at the end of the study and were discarded from further analysis. Distraction (low vs. high) and ease of grasping (easy vs. difficult) were entered as discrete between-subject variables in a general linear model (GLM) analysis, and degree of right-handedness was entered as a continuous between-subject variable. A marginally significant main effect of degree of right-handedness demonstrates that flexible right-handers gave higher ratings of attractiveness than rigid right-handers ($\beta = -7.40$, $F(1, 92) = 3.67$, $p = .059$). The two-way interactions of Ease of grasping x Distraction ($F(1, 92) = 4.94$, $p = .03$) and Degree of right-handedness x Distraction ($F(1, 92) = 7.28$, $p = .008$) were significant. However, all of these findings were qualified by a significant three-way-interaction among ease of grasping, distraction and degree of right-handedness ($F(1, 92) = 5.79$, $p = .02$) (see Figure 1.3). All other effects were insignificant ($ps > .18$). To interpret the three-way-interaction, analyses were performed separately for low and high distraction conditions. We found a significant two-way-interaction between ease of grasping and degree of right-handedness for the low distraction condition ($F(1,48) = 4.26$, $p = .04$) whereas this interaction was not significant for the high distraction condition ($p > .17$).

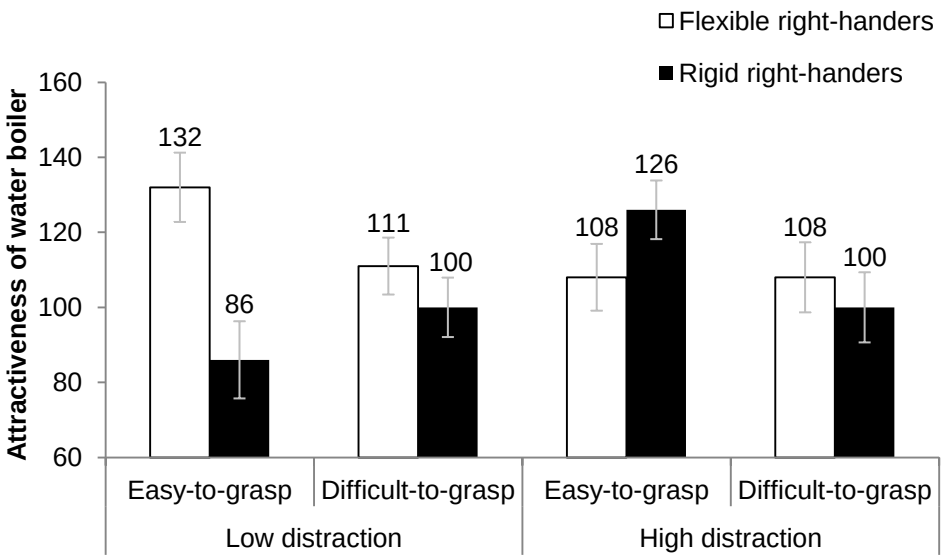

Figure 1.3. Attractiveness of a water boiler as a function of distraction, ease of grasping and degree of right-handedness in Study 4.
Note. Standard errors are represented in the figure by the error bars attached to each column.

Analyses of simple slopes reveal that the easy-to-grasp boiler was rated more attractive by undistracted flexible right-handers than by undistracted rigid right-handers (β = -28.47, $t(99) = -3.44$, $p = .001$), whereas the difficult-to-grasp boiler was rated equally attractive by undistracted flexible and rigid right-handers (β = -7.19, $t(99) = -1.17$, $p = .25$). Simple effects analyses show that undistracted flexible right-handers tended to find the easy-to-grasp boiler more attractive ($\hat{Y} = 132$, $SE = 9.24$) than the difficult-to-grasp boiler ($\hat{Y} = 111$, $SE = 7.59$, $t(99) = -1.74$, $p = .08$), whereas undistracted rigid right-handers found the easy- ($\hat{Y} = 86$, $SE = 10.29$) and difficult-to-grasp boiler ($\hat{Y} = 100$, $SE = 7.92$) equally attractive ($t(99) = 1.08$, $p = .28$). These findings indicate that, in the low distraction condition, we replicated the effect from Study 3 that flexible right-handers show a higher preference for an easy-to-grasp product than rigid right-handers.

Note that in the low distraction condition, only the attractiveness rating of the easy-to-grasp boiler by the flexible right-handers was significantly different from the neutral point (i.e., 100) on the scale ($\hat{Y} = 132$, $t(99) = 3.50$, $p < .001$, all other ps > .12).

Thus the findings suggest that the effect is driven by an increase in attractiveness of the easy-to-grasp product rather than by a decrease in attractiveness of the difficult-to-grasp product.

Further contrast analyses revealed that distraction indeed suppressed the motor fluency effect for flexible right-handers. As predicted, we found that undistracted flexible right-handers tended to judge the easy-to-grasp boiler as more attractive ($\hat{Y}$ = 132) than distracted flexible right-handers ($\hat{Y}$ = 108, *SE* = 8.9, *t*(99) = -1.87, *p* = .07). Distracted flexible right-handers in the easy-to-grasp condition ($\hat{Y}$ = 108, *SE* = 9.34) and difficult-to-grasp condition ($\hat{Y}$ = 108, *SE* = 8.90) did not differ in their attractiveness rating (*t*(99) = 0, *p* = .997).

As expected, it was revealed that highly distracted rigid right-handers rated the easy-to-grasp boiler as more attractive ($\hat{Y}$ = 126, *SE* = 7.82) than the difficult-to-grasp boiler ($\hat{Y}$ = 100, *SE* = 9.35), *t*(99) = 2.14, *p* = .04. Distracted rigid right-handers found the easy-to-grasp boiler more attractive ($\hat{Y}$ = 126, *SE* = 7.82) than did undistracted rigid right-handers ($\hat{Y}$ = 86, *SE* = 10.29, *t*(99) = 3.11, *p* = .003). This seems to suggest that the automatic body-driven action tendency is boosted when rigid right-handers are distracted.

GENERAL DISCUSSION

Many products have handles and need to be placed on store shelves or pictured on websites in some way or another. However it remained an open question as to how or whether this orientation cue impacts product evaluations of right-handers. In three experiments we find evidence for the existence of the motor fluency effect both when viewing physical products (Study 1) as in an online shopping contexts (Study 3 and 4). Grasping movements are not a prerequisite to find fluency effects (as addressed in Study

4), which makes these findings important for practitioners in diverse domains like advertising and online shopping. We replicate Ping et al.'s finding (2009) that right-handers prefer easy-to-grasp products, even when choosing between products within one category that can be compared on the basis of many other characteristics than orientation of handles. Most interestingly, however, our results carry evidence for two different routes to the motor fluency effect. First of all, we demonstrate that body feedback about biomechanical efficiency can create an experience of fluency and affect preference construction. We show that flexible right-handers pay more attention to situational constraints (Study 2) and as a consequence mainly these individuals show a preference for easy-to-grasp products (Study 3 and 4). When motor behavior is restricted to one side of the body, flexible right-handers prefer products of which the handle is oriented in the direction of the hand that is triggered to interact (Study 3). Additionally, when flexible right-handers are distracted from environmental cues, the effect is attenuated (Study 4). At first sight, we found less evidence for the automatic bodily driven mechanism of motor fluency. Based on Ping et al.'s (2009) intuitive explanation for the motor fluency effect, one might expect that rigid right-handers would have a strong preference for products oriented rightwards. However, we suggest that rigid right-handers employ fewer mental resources on deciding which hand to use to interact with the world than do flexible right-handers. Therefore, rigid right-handers' bodily sensations might easily be overruled by more deliberate processes. In support of this interpretation, only when rigid right-handers were distracted (Study 4), they were susceptible to motor fluency. Thus, our findings seem to suggest that preference construction can be automatically influenced by bodily actions, but that more deliberate processes often overrule the influence of automatic motor simulations. Future research could investigate which decision cues rigid right-handers rely on when undistracted, as this was outside the scope of the present research.

In Study 4 we demonstrate that the effect is driven by the increased liking of easy-to-grasp products, both for flexible and rigid right-handers, rather than by decreased liking of difficult-to-grasp products. This finding reinforces and extends the literature that shows that processing fluency is affectively positive (Reber, et al., 1998; Winkielman & Cacioppo, 2001).

We believe that our results are driven by ease of processing information (as induced by differences in ease of grasping), rather than by explicit imagery of product usage experiences. We cannot rule out that people consciously imagined performing actions with the products, but we did not explicitly ask them to do so and overall people made quick decisions. What speaks to our reasoning is that recent research showed that explicit motor imagery activated different motor regions in the brain than mental simulations of actions when reading action verbs (Willems, Hagoort, & Casasanto, 2010). Hence the impact of ease of grasping may be qualitatively different from the impact of (ease of) imagery. Imagery implies a more demanding cognitive strategy that could even reduce the unconscious effect of fluency of grasping. Further research could distinguish between effects of implicit mental simulations and explicit imagery.

Fluency effects are most pronounced when people make quick intuitive decisions. Future research could explore whether people prefer difficult-to-grasp products when they have to motivate their choices. Recently, it has been suggested that stimuli that are difficult to process seem more interesting and attractive (Labroo & Kim, 2009). When it is truly effortful to process information about a product, people may infer from their efforts that it must be really important to have it.

In this research we focus on right-handers and do not wish to claim that our findings will be mirrored for left-handers. Research has highlighted that left-handers are less lateralized and more ambidextrous than right-handers (Bryden, et al., 2000; Gonzalez, et al., 2007; Gurd, Schulz, Cherkas, & Ebers, 2006). In addition it is possible

that some left-handers adapt to a world predominantly organized for right-handers (Oldfield, 1971). All together these arguments suggest that left-handers may react qualitatively different than right-handers to their environment.

Wide areas of research in cognitive and social psychology, consumer behavior and neuroscience have now found evidence that our body has an impact on higher order cognition, in domains such as language (Glenberg, 1997) and emotion processing (Niedenthal, Brauer, Halberstadt, & Innes-Ker, 2001; Niedenthal, et al., 2009), action understanding (Tucker & Ellis, 1998), self-regulation (Hung & Labroo, 2011) and trust (IJzerman & Semin, 2009; Williams & Bargh, 2008). The present work about product preferences is in line with theories about embodiment by showing that consumers' (simulated) physical interactions with products have an impact on decision making processes. Not only do our findings indicate that information processing is embodied, such that actions can impact preference construction, we also go beyond this main embodiment effect and demonstrate that it is flexible and situated. Ease of grasping affects preference construction, but mainly for flexible right-handers who take into account situational constraints when interacting with the world. Our research thus highlights the notion that embodiment is context-dependent and suggests that researchers should not only show that embodiment effects exist, but also understand when they occur (Niedenthal, et al., 2010).

APPENDIX

Study 1

Target trials. Basting brushes, butter knifes, cleaning brushes, forks, hairbrushes, ice cream scoops, ladles, pizza cutters, potato mashers, razors, spades, spatulas, spoons, toothbrushes, vegetable peelers, whisks.

Filler trials with orientation. Bottle openers, combs, cooking tongs, cutters, graters, measuring cups, paintbrushes, sieves.

Filler trials without orientation. Alarm clocks, candles, boxes of dishwashing tablets, tubes of hand cream, jars, pencil sharpeners, rolls of toilet paper, vases.

Study 2 and Study 3

In Study 2, only one object was presented, whereas in Study 3 pairs of objects were presented. Trials with orientation were target trials in Study 2, and used for target and filler trials in Study 3.

Trials with orientation. Cleaning brush, flash light, gardening fork, ice cream scoop, mug, pan, pasta fork, sieve, water boiler, water jug, whisk, wrench.

Filler trials without orientation. Used in both studies: bottle of wine, hairspray, pillow, potato chips. Used in pilot study: box of cereals, clocks, box of dishwashing tablets, glass, hat, lamp, nailbrush, vase.

ESSAY 2

Doing Things Differently Instigates Openness to New Consumption Experiences

ABSTRACT

Interrupting routines can have dramatic effects on consumers' mindsets. When disrupted from the routine of the daily grind, people prefer more unique consumption experiences. Performing unusual actions, like left-handed actions by right-handers or using a new technology for the first time, increases the preference for scarce products and uncommon holiday destinations, and the willingness to try out new products. We show that explorative consumer behavior is triggered by heightened arousal as induced by novel actions. When people are aware of the unusual situation, the effect disappears. Alternative explanations driven by difficulty, mood regulation, increased self-awareness, and lower self-confidence are discussed and ruled out.

Keywords: need for uniqueness, openness to experience, curiosity, exploration, novelty, product innovation

INTRODUCTION

People are creatures of habit. They don't like change and often stick to the behavioral patterns they are used to. Regular activities, like routine trips to the store, are performed almost mechanically. But what happens if consumers' daily grind is disrupted? What if people find themselves in an unexpected novel situation, like, for example, when entering a store and receiving a welcome gift, or when using a newly introduced type of shopping cart? How would this affect subsequent behavior? The current research suggests that doing something unfamiliar can activate the drive to stand out from the cloud, to strive for uniqueness and new experiences.

Recent research on consumer mindsets by Wood (2010) found that people who experienced life changes were more likely to be attracted to new or unfamiliar options in terms of food and other product domains, whereas a lay theory perspective would predict that in times of change people choose their favorite food options to comfort themselves. Wood has suggested that consumers avoid old favorites in new, shifting and uncertain environments due to an "openness to change" mindset. Contrary to experiencing large changes in life, consumers frequently find themselves in unexpected situations. Hence we seek to find out if subtle novel environmental cues, just like life changes, can cause an increased openness to change in consumer mindsets. It has been shown that novelty is arousing and leads to curiosity and exploration (Berlyne, 1950). Therefore, we suggest that novel environmental cues are arousing and trigger not just openness to change, but openness to new consumption experiences.

Marketers would do anything to have consumers being open to new experiences and choose their new products or services. Amongst other strategies, they may highlight the newness of a product regarding its package, offer free trial periods, a temporary price reduction, or present a limited special edition of the product. Consumers who are no doubt easily tempted by new products are people who want to feel unique and special.

When people want to feel unique, they can differentiate themselves from others by the products they buy (Tian, et al., 2001). In order to convey uniqueness, people break rules and conventionalities and explore the marketplace: Uniqueness seekers search for variety in their product choices and prefer novel, scarce or unfamiliar products (McAlister & Pessemier, 1982). Because we propose that unusual situations trigger openness to new experiences, and because explorative consumption is central to the mindset of consumers who want to feel unique, we suggest that unusual situations will boost need for uniqueness.

In four studies, we examine how subtle situational changes impact consumers' mindsets and subsequent product evaluations. We demonstrate that merely performing a task differently than one is used to increases one's need for uniqueness. We also show that the impact of an unusual action boosts unique product choices by low uniqueness seekers to the level of high uniqueness seekers. When people's attention is drawn to the unusualness of their actions, the effect disappears. Finally we illustrate that uniqueness seekers are more open to new experiences, and that unusual actions increase arousal which in its turn triggers explorative behavior.

Our research adds to the existing literature about consumers' mindsets (Dhar, Huber, & Khan, 2007; Lee & Ariely, 2006; Wood, 2010) by suggesting that novelty and arousal can instill an explorative mindset. It may be of relevance to marketers to understand how novelty can render openness to new experiences and make consumers eager to try out new or unknown products. In what follows we develop the theoretical background and our hypotheses, before turning to our studies.

Environmental changes, arousal and exploration

A first insight into how environmental changes can trigger exploration is found in research about habits. The majority of people's actions are routine. Research about

habitual behavior shows that people with strong habits do not easily detect changes in the environment, search less extensively for information about alternative actions or the context itself and follow simple, shallow decision rules (Fazio, Ledbetter, & Towles-Schwen, 2000; Verplanken, et al., 1997; Verplanken & Wood, 2006). Interestingly however, habits can be changed by disrupting the environmental cues with which the habits are associated (Wood, et al., 2005). If novel experiences disrupt the habitual pattern of actions, then people's attention is drawn to new information and alternative actions are considered. Whereas research about habits suggests that subtle unusual experiences may disrupt habitual thinking and lead to heightened attention to change, research about curiosity suggests more specifically that unusualness may lead to explorative behavior.

Novelty, just like complexity and surprise, increases arousal, curiosity and exploration (Berlyne, 1950, 1960). Consider an in-store demonstration of a new food item that is freshly prepared on site by a demonstrator who distributes the samples for tasting. People feel attracted to the unknown, they are curious about the new product. Berlyne (1960) called this phenomenon perceptual curiosity, or the drive that is aroused by novel stimuli (as opposed to epistemic curiosity, or the desire for knowledge) (for a review, see Loewenstein, 1994). For example, when rats were familiarized with three cubes (or rings) for 5 minutes, and one of the cubes (rings) was then replaced by a ring (cube), it was found that they sniffed more and longer at the novel or odd shape (Berlyne, 1950). Similarly, people look longer at novel visual shapes (Berlyne, 1960). Smith, Malmo and Shagass (1954) showed by means of a psychophysiological measure that curiosity is associated with an increase in arousal. When people listened to a story of which some parts were made incomprehensible, arm muscles were tenser during inaudible parts of speech. Here, we argue that unusual actions are novel stimuli that are arousing and make people curious, and hence more open to new experiences. We

propose that in comparison with doing a task like one always does, performing an unfamiliar task way will increase exploration.

H1: Performing an unfamiliar action increases explorative consumption.

Need for uniqueness

We believe that performing an unfamiliar action will not just trigger openness to change among known products, but will be especially likely to create openness to new experiences, like an increased interest in uncommon or more unique products. This interest is typical for individuals who want to feel unique and special. Need for uniqueness is an important social dimension that stretches between the need to stand out of the crowd, and the need to belong to a group (Snyder & Fromkin, 1977). Being distinct can contribute to self-identity and self-esteem, but at the same time people do not want to be rejected by the social group they affiliate with. Therefore people search for optimal distinctiveness (Brewer, 1991). Although uniqueness seeking is considered as a stable personality trait (Lynn & Snyder, 2002; Snyder & Fromkin, 1977; Tian, et al., 2001), situational influences can change people's focus on the need to feel unique or similar to others. Levels of uniqueness seeking can be altered by e.g., providing bogus personality feedback (Brewer, Manzi, & Shaw, 1993; Markus & Kunda, 1986) or by presenting unique combinations of visual shapes (Maimaran & Wheeler, 2008).

Uniqueness seekers are constantly searching for ways to express their unique personality. Social identity forms a way to express one's distinctiveness (Brewer, 1991), but also choice is a means to self-expression (but see, Kim & Markus, 1999, p. for cultural differences in valuing choice). Research has demonstrated that people seek variety and deviate from their favorite options in order to be seen as interesting (Ariely & Levav, 2000; Ratner & Kahn, 2002). People can strive for uniqueness through their consumption patterns (Lynn & Harris, 1997; Tian, et al., 2001), as the possessions they

own contribute to their identity (Belk, 1988). For instance, research has shown that higher levels of need for uniqueness are related to a stronger desire for scarce experiences (Fromkin, 1970), and higher levels of consumer innovativeness (Lynn & Harris, 1997).

Because we propose that performing an unfamiliar action increases exploration, and because explorative consumption is fundamental to a mindset of uniqueness seeking, we suggest that deviations from common experience can increase uniqueness seeking and make people choose more unique products. If performing an unusual action heightens need for uniqueness, this would again strengthen our reasoning that unusual actions trigger explorative behavior.

H2: Performing an unfamiliar action triggers a need to be unique and makes people choose more unique products.

Incidental situational influences

Often people are not aware of the subtle cues that affect decision making processes. Schwarz (2006b) emphasized that cognitions take place in daily life, in continuous interaction with the world. Hence, context sensitivity may be adaptive because it can alert people to existing opportunities or by interrupting processes when needed. However the flip side of the coin is that sometimes great value is given to incidental irrelevant bodily cues and feelings when making decisions. Attribution theory suggests that people attribute events to internal dispositions (e.g., abilities, or motives) or to aspects of the external situation (e.g., task difficulty, time pressure) (Ross, 1977). People often show the tendency to underestimate the impact of situational factors and overestimate the impact of internal dispositions (Heider, 1958). This makes judgments more vulnerable to the effect of incidental cues. For example, shaking the head, as when agreeing with something, while watching positively valenced products creates even

stronger positive evaluations of these products (Förster, 2004). Also, in a study by Darke and colleagues (2006), incidental affect influenced consumers' choices. More participants preferred an inferior CD player that played a happy song over a CD player with superior features playing a sad song, than when no music was played at all during product evaluation. Recent research by Van den Bergh and colleagues (in press) shows that not only incidental feelings, but also bodily actions can impact choices. In one of their studies, they showed that consumers who shop by carrying a shopping basket (i.e., approach orientation by arm flexion), bought more vice products (e.g., candy bars) at the cashier desk than consumers who shop by pushing a shopping cart (i.e., avoidance orientation by arm extension). However it has been shown that people are able to correct for the impact of incidental cues when they are aware of their irrelevance in judgments (Darke, et al., 2006; Pham, 1998; Schwarz & Clore, 1983). When participants were asked to rate how the music they heard while evaluating the CD players made them feel, the increased preference for a CD player with happy music disappeared (Darke, et al., 2006). Therefore we believe that making people aware that the novelty they experience is trivial, will eliminate its impact on judgments. Hence we predict that when people are aware of the unfamiliarity of action, they will not show explorative consumption.

H3: When people's attention is drawn to the unfamiliarity of an action, explorative consumption disappears.

Overview of studies

In four studies we find evidence for these hypotheses. We show that performing an unfamiliar task boosts need for uniqueness (Study 1). Not only does it affect people's self-perceptions, it also affects behavior, as shown in Study 2 (choosing a scarce product), Study 3 (preferences deviating from a majority of consumers) and Study 4 (trying out new products). In Study 3, we show that when people's attention is drawn to the unfamiliar task, the impact on preference for more unique products disappears.

Finally, in Study 4, we demonstrate that performing an unfamiliar task increases arousal, which in its turn boosts explorative consumption. In our studies we make use of two different unfamiliar, unusual tasks, namely performing a task with the non-dominant hand (Study 1, 2 and 4) and making use of a new technological device to answer questions (Study 3). We test for alternative explanations based on perceived difficulty, heightened self-awareness, lowered self-confidence and mood regulation.

STUDY 1

In this study, we seek to find evidence for the hypothesis that performing an unfamiliar action boosts need for uniqueness. After an unusual or usual task, participants were asked to fill in the consumers' need for uniqueness scale, as developed by Tian et al. (2001). We expected participants who performed an unusual task to have a higher need to be unique. Higher levels of uniqueness seeking make people more likely to be creative, unconventional and dissimilar from others in buying products and combining possessions.

Method

Participants. Participants were 71 students (18 men) between 18 and 24 years old (M = 20.71, SD = 1.52), from a large Western European university. All students were recruited from an online subject pool and participated for monetary compensation. Participants were prescreened to be right-handers (i.e., writing with the right hand).

Procedure. Participants were seated in partly enclosed cubicles in front of a computer. Participants started with a choice task in which we induced an unusual feeling. They were shown pictures of 24 product pairs and asked to choose which of both they preferred. Each product pair consisted of two instances from the same product category (e.g., lamps, potato chips, pillows). In the "unusual" condition, participants were asked to put their left hand on the keyboard and indicate their choice by tapping on

"D" for the product on the left side of the screen and tapping on "K" for the product on the right side. In the "usual" condition, participants received the same instructions but were asked to use their right hand for indicating preferences. This task was followed by several unrelated filler tasks. Then participants completed the consumers' need for uniqueness scale (Tian, et al., 2001) on a 5-point Likert scale and were debriefed.

Results and discussion

The debriefing indicated that two participants were suspicious about the hand manipulation. These observations were removed for statistical analyses[2]. A one-tailed t-test with hand used as the independent variable and need for uniqueness (Cronbach's α = .94) as the dependent variable was significant ($t(67) = 1.88$, $p = .03$). Participants who used their left hand scored higher on need for uniqueness ($M = 2.66$) than participants who used their right hand during the choice task ($M = 2.39$). The finding of this study suggests that a subtle unusual action triggers a higher need for uniqueness. It should be noted that the consumers' need for uniqueness scale has been developed to measure people's stable trait of uniqueness. Nevertheless it seems that we were able to affect people's self-perceptions by means of our hand manipulation.

STUDY 2

If unusual actions induce a higher need for uniqueness, then people may want to express their uniqueness through the choices they make. Whereas Study 1 demonstrated that a subtle manipulation of unusualness had an impact on people's self-perceptions of uniqueness seeking, in this study we aim to find more evidence that such a manipulation can affect behavior.

[2] We demonstrate in Study 3 that drawing attention to an unusual situation, makes the effect disappear. Here, the pattern of results was attenuated, but still significant when suspicious participants were removed ($t(69) = 1.70$, $p = .05$).

One way for consumers to express their need for uniqueness is by buying scarce products (Lynn & Harris, 1997), since they are uncommon and cannot be adopted by a majority of consumers. In this study we made participants choose between different boxes of chocolates of which one was labeled as "limited edition". We predict that participants who perform an unusual task will pick the scarce or uncommon box of chocolates more frequently than participants who perform a usual (i.e., normal, frequently-performed) task. Moreover we expect this effect to be moderated by initial feelings of uniqueness, as consumers who have a chronic need for expressing their uniqueness will always feel tempted by scarce products.

An alternative explanation for our findings in Study 1 is that left-handed actions are more difficult for right-handers than right-handed actions which could turn people's focus on themselves. If people become self-aware, they act even stronger in line with their self-perceptions (Goukens, Dewitte, & Warlop, 2009). Therefore, one would predict an opposite pattern of findings. According to this alternative explanation, high uniqueness seekers who perform an unfamiliar task would then have an increased need for uniqueness, whereas low uniqueness seekers would show an increased need to make conservative choices.

Method

Participants. Participants were 99 students (59 male) between 18 and 23 years old (M = 19.30, SD = 1.31), from a large Western European university. All students were recruited from an online subject pool and participated for partial course credit. Participants were prescreened to be right-handers (i.e., writing with the right hand).

Procedure. Participants were seated in partly enclosed cubicles in front of a computer. They started by completing the consumers' need for uniqueness scale (Tian, et al., 2001). Next, they performed several unrelated filler tasks that took approximately 30

minutes to complete. Then, they took part in an estimation task that we used to induce a subtle unusual feeling. On top of the screen several black squares of different sizes were presented simultaneously. One black target square was presented in the middle of the screen. Participants were asked to estimate the average size of the squares presented on top by increasing (up arrow) or decreasing (down arrow) the size of the target square. In the "unusual" condition, participants were asked to put their left hand on the arrows of the keyboard, whereas in the "usual" condition, participants were asked to use their right hand. Estimation times in all ten trials were fixed to five seconds. Following this manipulation, all participants read a scenario on paper in which they were to choose a box of chocolates. They were told that friends invited them for dinner and that they would bring a box of chocolates as a gift. All four boxes that participants could choose from were given a name (i.e., Mephisto, Adelson, Sapho, and Horta), carried identical sales prices, and contained 20 milk chocolates. For each box, we showed a picture of a piece of chocolate together with a short description of the characteristic ingredients. The Mephisto box was labeled as a limited edition offer. After indicating their choice, participants filled in the situational self-awareness scale (SSAS, Govern & Marsch, 2001) on a 7-point scale (from 1 "*totally don't agree*" to 7 "*fully agree*"). Next they indicated how difficult they felt the square estimation task was on a visual analogue scale ranging from "*not difficult at all*" to "*very difficult*" (200 points). Finally participants were thanked and debriefed.

Results

Unique choice. All items from the need for uniqueness scale were aggregated to form one score of uniqueness (NFU, Cronbach's α= .93), with higher scores indicating a higher chronic NFU. Choices of chocolates were coded as 1 if participants chose the limited edition offer Mephisto, and 0 otherwise. In a logistic regression with choice (0 = not unique, 1 = unique) as a dependent variable, we included hand use (left vs. right) as a

discrete between-subjects variable and NFU as a continuous (standardized) between-subjects variable. As predicted, the analysis yielded a significant two-way interaction ($\chi^2(1, N = 99) = 4.16$, $p = .04$).

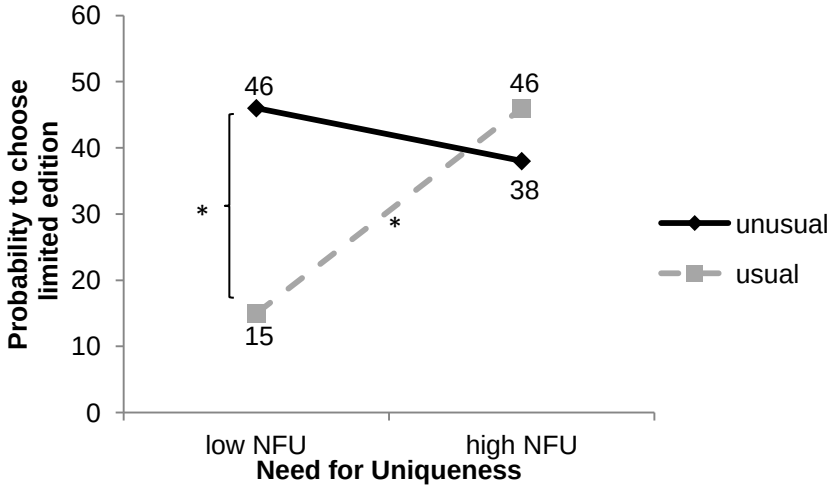

Figure 2.1. Probability to choose a scarce box of chocolates as a function of task unusualness and need for uniqueness.
Note. * p < .05

Slopes and simple effects analyses confirmed our hypotheses (Figure 2.1). First, NFU predicted the probability of choosing the unique product ($\beta = .69$, $\chi^2(1, N = 99) = 5.34$, $p = .02$) for participants who did the usual task (i.e., right hand). Thus, the choice for a limited edition indeed seems to express uniqueness seeking. Performing an unusual task boosted low NFU participants (M_{NFU} - 1*SD*) likelihood of choosing a limited edition offer from 15% (usual task) to 46% ($\chi^2(1, N = 99) = 5.11$, $p = .02$), whereas the likelihood of choosing the limited edition did not change for high NFU (M_{NFU} + 1*SD*) participants (i.e., 46% in usual task vs. 38% in unusual task, $\chi^2(1, N = 99) = .23$, $p = .63$). In the unusual task, both low and high NFU participants were equally likely to choose a limited edition offer (i.e., 46% for low vs. 38% for high NFU, $\beta = -.46$, $\chi^2(1, N = 99) = .25$, $p = .62$).

Task difficulty and self-focus. Performing the square estimation task with the left or right hand did not affect perceptions of difficulty ($F(1, 98) = .02$, $p = .89$) or situational self-awareness (Cronbach's $\alpha = .78$, $F(1, 98) = .32$, $p = .57$). Also, perceptions

of difficulty were not correlated with situational self-awareness. Adding task difficulty and self-focus as covariates in the analysis did not change the pattern of results suggesting that these factors did not mediate the effect of the unusual task and NFU on unique choices.

Discussion

In Study 2 we found that in usual circumstances, people follow their chronic dispositions to seek or avoid uniqueness when choosing between common and scarce product alternatives. High uniqueness seekers were more likely to choose a scarce box of chocolates. However, an unusual action boosted the preference for an uncommon, scarce product for low NFU individuals, such that they chose a limited edition box of chocolates as a gift as frequently as high NFU individuals. The finding that only low NFU people were affected by the manipulation of unusualness is consistent with the idea that the need to feel unique is chronically active for high NFU people (Maimaran & Wheeler, 2008).

We did not find evidence for the alternative explanation that an unusual task increases self-awareness. Additionally, low uniqueness seekers showed an increased tendency for uniqueness after performing an unusual task rather than an increased tendency for common options. Gao, Wheeler and Shiv (2009) have demonstrated that unfamiliar actions can shake one's sense of self and lower one's self-confidence. For example, writing an essay with the non-dominant hand about one's health concerns or intelligence lowered self-confidence, and as a consequence participants tried to restore their self-image by choosing products that communicated intelligence and health. In Study 1 and 2 we made participants perform a task with the dominant (usual) or nondominant (unusual) hand. One could therefore argue that this manipulation lowered self-confidence like it did in Gao et al.'s research. However our manipulation did not

make people think explicitly about themselves. Nevertheless, to overcome this possible alternative interpretation of our findings, we make use of a different task in Study 3.

STUDY 3

In this study it is our goal to generalize our findings and use another manipulation of task unusualness than in the two previous studies. In this study, we let people manipulate a cutting-edge multitouch computer screen with a computer mouse or by tactile stimulation. Afterwards, participants are asked to choose holiday destinations after being told which destinations a majority of peers had chosen. High uniqueness seekers are interested in unconventional products (Tian, et al., 2001). Hence we expect that participants who give their preferences using the touch screen (a novel experience compared to using a computer mouse) will make more unique travel choices. Furthermore we expect that this effect will be eliminated when participants are made aware of the unusual nature of the response format. Therefore, we compare an explicit and implicit unusual condition with a control, or usual, condition.

Finally, our theoretical analysis suggests that touching a computer screen does not make people question themselves in general or make them dwell on their particular shortcomings. However we test if our manipulation affects perceived task difficulty and feelings of self-worth, in order to rule out this alternative explanation.

Method

Participants. Eighty students (32 male) between 17 and 30 years old (M = 21.38, SD = 1.93) from a large Western European university participated in this research. All students were recruited from an online subject pool and participated for monetary compensation.

Procedure. Participants were seated in a partly enclosed cubicle. First they participated in a "landscape evaluation" task that we used to manipulate task unusualness. A large computer screen (i.e., Dell™ SX2210T multitouch monitor) was placed in front of them. All instructions were provided in a leaflet. In 20 trials participants were asked to indicate which of two nature landscapes they liked most. After each pair of pictures disappeared from screen, participants clicked on a letter "A" (left side) or "B" (right side) that appeared on the screen to indicate their preference. In the "usual" condition, participants made use of a computer mouse to indicate which landscape they preferred. No explicit instructions about the computer mouse were given. In the "implicitly unusual" condition, participants were briefly explained how to use the touch screen with the following instructions: *"You use the touch screen as you would otherwise use the computer mouse. Briefly touching the screen once is the same as one left mouse click."* In the "explicitly unusual" condition, we turned participants' attention to the unique experience of using a touch screen with these instructions:*"This task is different than what you are used to in this lab. There is no computer mouse, since this monitor is a touch screen. You use the touch screen as you would otherwise use the computer mouse. Briefly touching the screen once is the same as one left mouse click."* Subsequently, participants in the explicitly unusual condition answered two questions on 7-point Likert scales: '*To what extent are you used to working with a computer that has a touch screen?*' (from 1 = *not at all* to 7 = *very strongly*) and '*Which type of control do you use most frequently?*' (from 1 = *I always use a computer mouse* to 7 = *I always use a touch screen*). Following the landscapes task, participants filled in a poll about travel destinations. In this poll, participants could see that a majority of previous students had selected certain destinations. The extent of nonconformity (based on a measure by Griskevicius, Goldstein, Mortensen, Cialdini, & Kenrick, 2006) served as our main dependent measure. We told participants that the poll was organized by a major travel agency. Participants were asked to select their favorite travel destination among two

options in the categories city trip, winter sports and exotic beach holiday. Participants were informed that over 100 students had already taken the poll. It was mentioned that 79% chose New York to San Francisco (city trip), 72% chose France to Austria (winter sports) and 86% chose Tenerife to La Palma (exotic destination). Participants indicated their own choices on a 7-point scale ranging from *Strong preference for A* (i.e., destination chosen by majority of students) to *Strong preference for B*. Afterwards, in all conditions we measured state self-esteem (Robins, Hendin, & Trzesniewski, 2001) and situational self-awareness (Govern & Marsch, 2001) on 7-point scales (from 1 "*totally don't agree*" to 7 "*fully agree*"). Participants in the implicitly and explicitly unusual condition were asked to write down all the devices they owned which were equipped with touch screens. Finally all participants were asked to rate the difficulty of the landscapes task (7-point Likert scale from 1 = *not difficult at all* to 7 = *very difficult*).

Results and discussion

We conducted an ANOVA with task unusualness (3 levels: usual, implicitly unusual and explicitly unusual) as a discrete between-subjects variable, destination (3 levels: city trip, winter sports, and exotic beach holiday) as a repeated within-subject variable, and nonconformity as the dependent measure. Destination was significant ($F(2, 154) = 3.81$, $p = .02$) indicating that some popular destinations were stronger in eliciting preferences than others. Post-hoc paired t-tests made clear that the nonconformity to choose San Francisco over New York was smaller ($M = 3.10$, $SD = 1.79$) than for Austria over France ($M = 3.83$, $SD = 2.02$; $t(79) = 2.48$, $p = .02$) and for LaPalma over Tenerife ($M = 3.63$, SD = 1.25; $t(79) = 2.21$, $p = .03$). No differences emerged between Austria and LaPalma ($t(79) = .75$, $p = .46$). Most importantly however, task unusualnes was also significant ($F(2, 77) = 3.55$, $p = .03$). Since no interaction emerged (F(4, 154) = .98, p = .42), the effect of task usualness was similar for all destinations. In the implicitly unusual condition, participants preferred unique travel destinations more ($M = 3.94$, $SD = .88$)

than in the control condition (M = 3.25, SD = 1.12, $t(79)$ = 2.53, p = .01), and in the explicitly unusual condition (M = 3.38, SD = .96, $t(79)$ = 2, p = .05). No differences emerged between the usual condition and the explicitly unusual condition ($t(79)$ = .50, p = .62). See Figure 2.2 for a visualization.

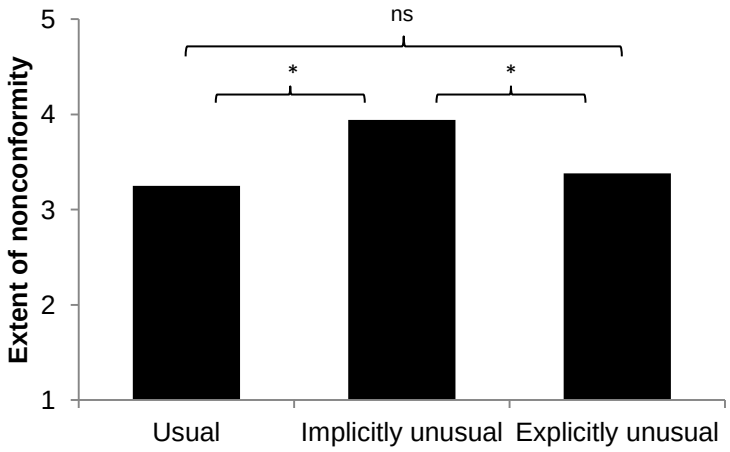

Figure 2.2. Extent of nonconformity as a function of task usualness and awareness.
Note. * $p < .05$

The conditions did not have a different impact on perceived difficulty, self-esteem or self-awareness (all *ps* > .18). Adding these factors in the analysis as covariates did not change the pattern of results described above, suggesting that they did not mediate the effect of task unusualness on nonconformity.

We further explored whether the novelty of using a touch screen was driving the effect, by taking a closer look at the number of devices with a touch screen that participants owned. We created a dummy coded variable "habituation to touch screens" (0 = no habituation, participant owns no devices, N = 36; and 1 = habituation, participant owns devices, N = 16, max. number of owned devices = 2). We did not ask for this information in the control condition. None of the participants owned a computer with a multitouch monitor. An ANOVA on nonconformity with explicitness (implicitly special vs. explicitly special) and habituation as discrete between-subjects variables

revealed that the omnibus F-test was marginally significant ($F(3, 50) = 2.55$, $p = .07$). The difference between conditions was significant for non-habituated participants ($p < .01$), whereas the difference between conditions was insignificant for habituated participants ($p > .89$) (Figure 2.3). Only participants who truly experienced the touch screen manipulation as novel, and were not explicitly made aware of this, chose more unique travel destinations.

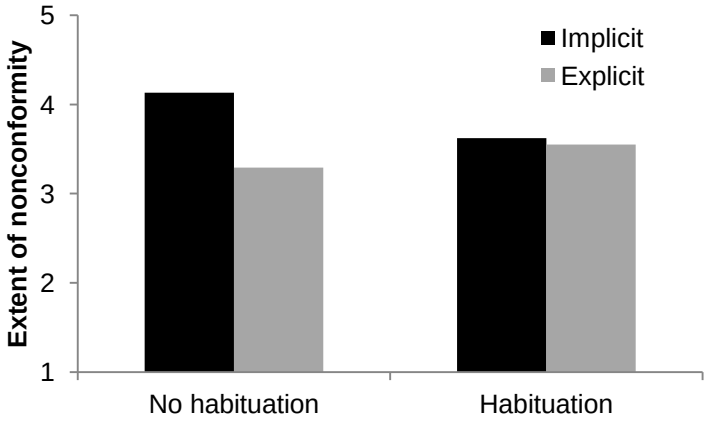

Figure 2.3. Extent of nonconformity as a function of habituation to touch screen devices and explicitness.

STUDY 4

So far we have demonstrated that an unusual task boosts uniqueness seeking. Self-perceptions of need for uniqueness increased in Study 1, people were attracted more by a scarce, limited edition of chocolates in Study 2, and preferred unconventional holiday destinations in Study 3. When people were aware of the unusualness of the task, it did not impact behavior. Taken altogether, these findings seem to suggest that an unusual experience triggers a mindset of openness to new experiences. With a little imagination, the instances of uniqueness seeking that we have tested in Study 2 and 3 could already be considered examples of interest in new experiences. To test our assumption that people who are high in need for uniqueness, are also more open to new experiences, we conducted a pilot study with 91 students (35 men, $M_{age} = 21.31$, $SD_{age} =$

1.72) who completed the consumers' need for uniqueness scale (Tian, et al., 2001), followed by the openness to experience scale of the HEXACO personality inventory (Lee & Ashton, 2004). Need for uniqueness (Cronbach's α = .93) was moderately positively correlated with openness to experience (Cronbach's α = .81; r = .31, p = .003, see Table 1 for correlations between subscales). More specifically we found that two dimensions of openness to experience were correlated with need for uniqueness, namely inquisitiveness (i.e., a tendency to seek information about, and experience with the natural and human world) and unconventionality (i.e., a tendency to accept the unusual). The two other dimensions, namely aesthetic appreciation (i.e., enjoyment of beauty in art and nature) and creativity (i.e., an inclination for original thought and artistic expression) were not associated with uniqueness seeking. Indeed, inquisitiveness and unconventionality seem to address best our concept of exploring new opportunities, which goes along with uniqueness seeking.

Table 2.1. Correlations between subscales of Openness to Experience and Need for Uniqueness.

	Need for Uniqueness		
	Creativity	Counter-conformity	Avoidance of Similarity
Openness to Experience			
Aesthetic appreciation	-.12	.14	.02
Inquisitiveness	.30**	.21*	.16
Creativity	-.06	.08	.003
Unconventionality	.12	.20†	.40***

Note. †$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

Finally, in Study 4, we investigate more thoroughly whether an unfamiliar task instigates openness to new experiences. As curiosity has been shown to follow from novelty and arousal (Berlyne, 1960), in this study we investigate whether an unusual situation goes along with heightened arousal to eventually lead consumers to explore and try out new things. Demonstrating that our manipulation of inducing a new experience leads to an increase in arousal and explorative consumption would strengthen our claim

that environmental cues of change can activate openness to new experiences. We test this proposition in the domain of product innovations, once again linking exploration to uniqueness seeking, since high need for uniqueness seekers tend to be innovators (Lynn & Harris, 1997). Furthermore, if an unusual experience makes consumers more curious about newly launched products, this may have interesting practical implications for marketers. We expect that participants performing an unusual task will be more likely to try out new products than participants performing a usual task.

So far, we have observed the effects of unusual experiences on novelty seeking without any parallel effect on perceived task difficulty, on self-awareness, or on self-esteem. However, another possible alternative explanation is that an unusual task prompts negative affect because of disfluent information processing. Experiencing negative feelings, people may want to repair their mood and indulge themselves with a special treat (Tice, Bratslavsky, & Baumeister, 2001). To confront affect regulation with the novelty-driven curiosity hypothesis, we measured three dimensions of emotions, namely status, level of arousal and valence (Morris, 1995). If mood regulation is driving the effect, the familiarity of the task should impact uniqueness seeking through valence. If novelty drives uniqueness seeking, we expect changes in arousal. We expect no differences in status. As we use the same hand manipulation as in Study 1 and 2, we test explicitly whether feelings of self-worth or self-confidence are altered by task unusualness.

Method

Participants. Seventy-two students (28 men) between 19 and 29 years old (M = 21.35, SD = 1.80) from a large Western European university participated in this research. All students were recruited from an online subject pool and prescreened to be right-handers. They participated for monetary compensation. Seven participants were

discarded from further analysis because they did not comply with the instructions for the usual (n = 3) or unusual (n = 4) task.

Procedure. First participants took part in the product choice task that was used to manipulate task unusualness. For 20 product pairs, participants indicated their choice by means of their right (i.e., usual) or left (i.e. unusual) hand (see Study 1 for further details). Immediately following this manipulation, we measured participants' mood, status and arousal by administering the Self-Assessment Manikin (Morris, 1995), a pictorial scale with 5 graphic figures. Participants indicated on a visual analogue scale (100 points) which of the 5 figures corresponded to their instant emotional state. For the arousal dimension, the SAM figures ranged from relaxed, sluggish, and sleepy to wide-eyed and excited. For the mood valence dimension, SAM figures ranged from smiling and happy to frowning and unhappy. For the status dimension, the figures ranged from tall to little. Additionally, we assessed participants' state self-esteem (Heatherton & Polivy, 1991) and state self-confidence ("*At this moment I feel self-confident*") on 7-point scales (from 1 "*totally don't agree*" to 7 "*fully agree*"). Next, all participants took part in an additional seemingly unrelated study about product launches. They were asked to express their interest in trying out four new products (i.e., a new taste of a leading brand of potato chips, a new fragrance from their favorite perfume, a new layout for Facebook, a 3D TV set) on a visual analogue scale (10 points) ranging from '*No interest at all*' to '*Highly interested*'. Finally, we assessed situational self-awareness (Govern & Marsch, 2001) on a 7-point scale (from 1 "*totally don't agree*" to 7 "*fully agree*") and perceived difficulty of the product choice task on a visual analogue scale (ranging from 1 "*not difficult at all*" to 10 "*very difficult*").

Results

For further analyses, we excluded one participant in the unusual condition who deviated considerably from others' reactions to the product launch task (based on the interquartile criterium for outliers, Tukey, 1977)[3].

Explorative consumption. First, we tested whether the hand manipulation affected explorative consumption. We performed an ANOVA on willingness to try out product launches with task unusualness (usual vs. unusual) as a between-subject variable and product type as a within-subject variable (perfume, potato chips, Facebook, and 3D TV set). As predicted we found that task unusualness affected exploration ($F(1, 62) = 4.88$, $p = .03$). Participants who did the unusual task were more interested in trying out new products ($M = 4.91$, $SD = 1.32$) than participants in the usual task condition ($M = 4.00$, $SD = 1.94$). The effect of product type was also significant ($F(3, 186) = 16.12$, $p < .0001$), indicating that some products attracted more interest than others. Potato chips ($M_{chips} = 6.09$, $SD = 2.25$) were preferred over all other product launches (all p's < .001). TV ($M_{3DTV} = 4.45$, $SD = 3.14$) and perfume ($M_{perfume} = 4.39$, $SD = 2.96$) did not differ ($p = .89$), but were both preferred over trying out Facebook ($M_{Facebook} = 2.94$, $SD = 2.81$) (both p's < .01). However, we found no significant interaction between task unusualness and product type ($F(3, 186) = .86$, $p = .46$), indicating that the effect of task unusualness was identical across products.

Arousal. To explore whether a usual task increases arousal, we conducted an ANOVA on arousal, as measured by the Self-Assesment Manikin, with task unusualness as an independent between-subject variable. We found that participants in the unusual task condition experienced higher levels of arousal ($M = 46.97$, $SD = 16.88$) than those in the usual condition ($M = 31.65$, $SD = 18.85$; $F(1, 62) = 11.77$, $p = .001$). We tested the indirect effect of task unusualness via arousal on exploration by means of a

[3] We applied the same procedure in all studies, but only here did we find outlying observations.

bootstrapping procedure (Preacher & Hayes, 2004). The indirect effect (tested with 1000 bootstraps) was estimated to be .29 (*SE* = .18) with a 95% confidence-interval of [.04-.82], supporting the existence of the indirect effect and the role of arousal as a mediator. The direct effect of task usualness on exploration was reduced when arousal was added to the model ($F(1, 61) = 1.92$, $p = .17$).

Valence. There was a marginally significant effect of task unususalness on mood ($F(1, 62) = 2.87$, $p = .10$). On average, participants felt rather happy when performing the product choice task, but in the usual task condition, participants felt slightly happier (*M* = 68.26, *SD* = 11.80) than in the unusual task condition (*M* = 62.15, *SD* = 16.49). However, the indirect effect (task unusualness → mood → exploration) was not reliable, yielding a value of .02 (*SE* = .08) with a 95% confidence-interval of [-.10-.28]. Furthermore, the direct effect of task usualness on exploration was not reduced when mood was added to the model ($F(1, 61) = 4.40$, $p = .04$), which indicates that mood did not mediate the effect of task unusualness on exploration.

Status. No differences in status emerged between participants in the usual and unusual condition ($F(1, 62) = 0.94$, $p = .34$).

Self-esteem, self-confidence, self-awareness and perceived task difficulty. Task unusualness did not affect situational self-esteem (Cronbach's $\alpha = .85$; $F(1, 62) = 1.24$, $p = .27$), nor its subscale of performance self-esteem (Cronbach's $\alpha = .80$; $F(1, 62) = 1.74$, $p = .19$). We found no differences between conditions in self-confidence ($F(1, 62) = .31$, $p = .58$), situational self-awareness (Cronbach's $\alpha = .86$; $F(1, 62) = .02$, $p = .88$) or perceived task difficulty ($F(1, 62) = 1.42$, $p = .24$).

Discussion

With this study we demonstrated that performing an unusual task heightened arousal and as a consequence made people more likely to explore new products. Right-

handers who used their left hand in an initial task were more interested in trying out a variety of new product launches than participants who used their dominant right hand. We did not find evidence that mood mediated the effect of task unusualness on exploration, suggesting that mood regulation was not at play here. Our findings present support for the idea that experiencing novelty inclines people to be more open to new experiences. As in all previous studies, performing an unfamiliar task was not perceived as more difficult than a familiar task, did not make people more self-aware, and did not lower their self-esteem or self-confidence.

GENERAL DISCUSSION

Unfamiliar circumstances can severely impact how people behave. Previous research has shown that in times of changes in life people break with their habits (Wood, et al., 2005) and deviate from their favorite product choices (Wood, 2010). Wood (2010) has therefore suggested that experiencing change instigates a mindset of openness to change. In this article, we tried to accumulate more evidence for this perspecitive by linking novel experiences with uniqueness seeking and explorative consumer behavior. We argued that novelty leads to curiosity (Berlyne, 1950), which may lie at the origin of openness to new experiences. Our research focused on uniqueness seeking, as an instance of openness to new experiences that is relevant in a marketing context. By definition, people who have a high need for uniqueness attempt to find ways to distinguish themselves from others (McAlister & Pessemier, 1982; Snyder & Fromkin, 1977; Tian, et al., 2001). It is easier to create a unique and personal style when one thinks outside the box, and explores new trends. In four studies we illustrated that performing an unfamiliar task increased participants' self-perception of uniqueness seeking (Study 1), made them more likely to buy a scarce box of chocolates (Study 2), encouraged them to choose uncommon holiday destinations (Study 3) and motivated them to try out newly

launched products (Study 4). We have generalized the impact of unfamiliar circumstances to a wide variety of behaviors that are important to consumers.

Seeing novel visual geometrical shapes also stimulates uniqueness seeking (Maimaran & Wheeler, 2008). Whereas Maimaran and Wheeler suggested that exposure to unique combinations of symbols activates the concept of uniqueness and primes subsequent unique behavior, we propose a second route for subtle environmental cues to influence uniqueness through an explorative mindset. In all studies, we chose dependent measures of uniqueness that were clearly closely related to explorative consumption patterns. Hence we argue that exploring the world, or being open to new experiences, underlies uniqueness seeking and can be triggered by unfamiliar actions. Like Maimaran and Wheeler, in Study 2 we found that an unfamiliar task boosts uniqueness seeking especially among low uniqueness seekers. This strengthens our argument that high uniqueness seekers are chronically more open to new experiences. Indeed, in a pilot study, we found that need for uniqueness is associated with openness to new experiences.

We have ruled out several alternative explanations for our findings. First of all it is important to highlight that perceived task difficulty did not differ between groups who performed familiar and unfamiliar tasks in Studies 2, 3 and 4. Whereas task difficulty is closely related to each of the alternative explanations that we have discussed, it does not ground our explanation of the findings that novelty triggers curiosity and hence an interest in unique products. A first alternative explanation could be that an unfamiliar task makes people more self-aware which then causes them to act more in line with their preexisting self-perceptions of uniqueness (Goukens, et al., 2009). However, conversely, we showed in Study 2 that the effect of the unfamiliar task on uniqueness seeking was most pronounced among people who have a low need to feel unique. Additionally, task unusualness did not affect situational self-awareness in Studies 2, 3 and 4. A second

alternative explanation is that an unfamiliar task lowers self-confidence such that participants' choices would reflect a way to re-bolster their self-confidence (Gao, et al., 2009). At first sight, one could indeed argue that writing an essay with the nondominant hand about one's qualities – the manipulation that was used by Gao and colleagues – is similar to performing an estimation or choice task with the nondominant hand (Studies 1, 2 and 4). In their paper Gao et al. generalized their findings and suggested that more subtle situational factors, like performing familiar and routinized tasks in unfamiliar ways, could trigger metacognitions that something is wrong. Subsequently, this could affect ongoing thought about the self and reduce self-confidence. However, we think our evidence clearly demonstrates that an unfamiliar task, even a task performed with the nondominant hand, in itself does not make people question their abilities or signal that something is wrong. Indeed, our manipulations did not affect self-confidence, self-esteem or mood, all three of which are highly related (Baumgardner, 1990). Instead, an unfamiliar task made people excited and eager to learn more about opportunities in the environment, which we demonstrate in Study 4. Finally, we showed that our results were not driven by mood regulation. It could be that experiencing negative affect would make people want to indulge themselves to repair their mood (Tice, et al., 2001). In Study 4 we found that performing an unusual task only marginally reduced positive mood and that mood did not mediate the effect of task unusualness on explorative consumption.

Where affect-as-information theory focuses on the impact of incidental affect on judgments (Schwarz & Clore, 1983), here we show that people can also discard bodily cues when making decisions. We have shown that when people were explicitly told that they were about to do a novel task, the impact of task unusualness on uniqueness seeking was eliminated (Study 3). This is in line with attribution theories, suggesting that people do not make inferences from events when they realize that these events should be attributed to aspects of the external situation (Ross, 1977).

We proposed that environmental changes lead to exploration just like novelty does (Berlyne, 1950). We showed that performing an unusual task increased the experience of arousal and stimulated trying out new products. In line with our findings that unusual situations trigger openness to new experiences, it was recently found that living in and adapting to a foreign culture, or experiencing incongruent emotions makes people more creative and think more broadly (Fong, 2006; Huang & Galinsky, in press; Maddux & Galinsky, 2009). These effects resulted from novel or uncommon experiences, like our manipulations, and have led to more creative and unconventional thinking. We suggest that an explorative mindset or being open to new experiences may underlie these findings. We showed that openness to experience and uniqueness seeking are positively correlated. Prior research also shows that openness to experience, creativity and unconventionality are positively correlated (Feist, 1998; McCrae, 1987). Further research could explore the causal relationships between novelty, divergent thinking and creativity. Moreover, future research should also investigate the boundaries of the effect of novelty and arousal on openness to new experiences. Berlyne (1960) has stated that people enjoy intermediate levels of arousal. When bored, people seek more stimulation. However, too much stimulation is also aversive. Unfamiliar stimuli that by no means relate to what is known evoke fear rather than curiosity. The tasks that we used in our studies were new to participants, but still related to familiar tasks and hence not aversive.

In our research we focused on the act of doing things differently and chose to make experiencing change very concrete. Whereas previous research about breaking habits looked at experiencing changes in one's life (Wood, 2010), we wanted to investigate if more temporary and subtle deviations from common experience yielded similar effects. Bodily actions or postures can strongly influence decision making in ways which people are often unaware of (Barsalou, 2008). For example, when clenching their fist, people exert more willpower (Hung & Labroo, 2011). Or when carrying a heavy weight, the topic one thinks about seems more important (Jostmann, et al., 2009). We

operationalized ‘doing things differently’ by having our participants do a familiar or unfamiliar task. In Studies 1, 2 and 4, right-handers performed a task (i.e., a product choice task in Studies 1 and 4, and an estimation task in Study 2) by means of their dominant right hand, which is familiar, or their non-dominant left hand, which is unfamiliar. In Study 3, participants were confronted with a new multitouch computer screen that they either manipulated by touch (unfamiliar) or by a computer mouse (familiar). We think the words unusual, unfamiliar and novel can be used interchangeably to address the phenomenon we examined in this research. Although we believe that unexpected and surprising cues would result in similar effects, we do not think that they are synonymous to unusual, unfamiliar and novel. Unexpected and surprising seem to follow from having certain expectations, whereas we did not create any prior expectations in our studies.

Our findings increase understanding of how marketing actions can influence shoppers along the path to purchase. By breaking up the daily grind, marketers can evoke exploration among consumers and make them more likely to try temporary offers or test new products. It is especially interesting that the unusual experience can be subtle and entirely unrelated to the consumer choice or product explorations that follow. Additionally, consumers who would normally stick to their habitual patterns of actions are most likely to be affected by subtle environmental changes. Our research suggests that novel actions are a powerful tool to change habitual behavior, unless people are aware of the source of change. Furthermore, we wish to highlight that novelty should probably not be overwhelming to the point that it induces negative affect and turns consumers off. Berlyne (1960) suggested that curiosity is induced by novel cues that one can relate to what is known. Objects that are unfamiliar in all aspects induce fear instead. It is possible that too much stimulation would make people want to search for comfort in known and favorite products. For example, recent research indicates that people who move frequently prefer familiar over unfamiliar stores (Oishi, Miao, Koo, Kisling, &

Ratliff, in press). However, living abroad has also been shown to induce creativity (Maddux & Galinsky, 2009). Similarly, Wood's studies (2010) did suggest that both positive and negative changes in life led to openness to change. Hence the impact of aversive novel stimuli is an empirical question open for future investigations.

Previous research has shown that it is a pleasant surprise to consumers to receive in-store coupons (Heilman, Nakamoto, & Rao, 2002). The coupons that consumers received were specific to planned purchases. Heilman and colleagues found that the number and dollar value of unplanned purchases increased. More specifically, consumers made more purchases of treat items, and of products that were cognitively related to or placed in close proximity to the product of the surprise coupon. Although it has not been tested in the conceptual model by Heilan and colleagues, based on our findings, we expect surprise in-store coupons to especially influence purchases of products that express uniqueness and are worth exploring. This is just one example to show how marketers can trigger a change in mindset. A wide variety of novel actions, like changing the design of the company's website from time to time, having consumers try out a product sample at the entrance of a store, can disrupt consumers' habitual thinking and stimulate curiosity. Further research could investigate if unfamiliar environments, like the airport for infrequent flyers, instigate exploration, such that stores in these environments could be recommended to focus attention of consumers on product innovations or customization of products.

ESSAY 3

Leave Me as I Am:

Arm Crossing Consolidates Feelings of Power

ABSTRACT

Gestures, movements and facial expressions that people make, have an impact on what they feel, want or think. In this research the body posture of arm crossing is investigated. We demonstrate that there is no one-to-one relationship between arm crossing and feeling powerless, as suggested by previous research. Instead, the impact of arm crossing on feelings of power and reliance on external influences differs in function of self-esteem. When crossing arms, people with high self-esteem rely less on situational cues whereas people with low self-esteem make more context-dependent decisions. These differences are mediated by feelings of (lack of) power. Interestingly, people seem to associate arm crossing with protecting themselves from external influences (e.g., by a sales person). We discuss the implications of our findings for overcoming persuasion attempts by others.

Keywords: nonverbal behavior, body openness, arm crossing, self-esteem, power, context-dependency, persuasion

INTRODUCTION

It is amazing how much we communicate with our bodies without speaking. We smile when we feel happy, turn our back to someone we would rather ignore, and frown our eyebrows when concentrated, to name just a few examples. If body talk guides interpersonal communication, it is important to find out not only how nonverbal behavior can be interpreted by others, but also how body postures or expressions make the actor feel. We investigate the posture of crossing arms in front of the body, and demonstrate that it can induce opposite feelings of both power and lack of power. Our contribution to existing literature about embodiment effects (e.g., Stepper & Strack, 1993) is that the impact of a body posture on behavior and thinking may depend on individuals' dispositions, like self-esteem.

Research suggests that a constricted posture, like arm crossing, makes people feel less powerful (Carney, et al., 2010; Huang, et al., 2011). Now imagine two people who, independently, visit a bank to sign up for a mortgage. One is well-informed and knows exactly which type of mortgage he wants to obtain, and how he can get it. The other does not understand much about the different opportunities and hopes to learn more from the bank teller. At first, the bank teller makes both people a not so interesting offer. Which next negotiation step would the clients take when crossing their arms in front of the body while listening? Arm crossing may induce lower negotiation power and be detrimental to finding a good interest rate for a mortgage. However, whereas arm crossing has been associated with submission (Gifford, 1994), it has been suggested that postures are not always unidirectionally linked to feelings of power, such that contextual factors could impact the meaning of a posture (Hall, Coats, & Smith LeBeau, 2005). Arm crossing could not only be an act of vulnerability, but also of not giving way to pressure (Argyle, 1988). Therefore, one might also expect that this act does not make both people feel similar. Could it be that this posture makes some people feel stronger and other

people weaker? In this research we investigate how one posture may lead to different appraisals of one's own power and how these appraisals may influence subsequent behavior. In a first study, we demonstrate that the impact of arm crossing on how people behave depends on people's initial feelings of self-worth. The posture makes people with high self-esteem feel even more powerful and adjust less to the environment, whereas it lowers feelings of power for people with low self-esteem and makes them think less independently.

Bodily feedback

Ample research has shown that the gestures, movements and facial expressions people make can have an impact on what they feel, want or think. For example, flexing the arm, as one would do to grasp something pleasant, induces reward-seeking behavior: Consumers are more likely to buy vices when carrying a shopping basket, than when pushing a shopping cart (Van den Bergh, et al., in press). In a study by Hung and Labroo (2011), it was found that students who had a health goal and held a pen firmly in their hand while buying a snack for lunch were more likely to resist unhealthy temptations than when they were holding the pen loosely, suggesting that when making a fist, people exert more willpower.

Whereas these findings about consumer choices provide exemplary evidence for the phenomenon that people can be affected by bodily movements, most prior research studied the impact of emotional body postures and facial expressions on feelings and judgments (Duclos, et al., 1989; Flack, Laird, & Cavallaro, 1999; Stepper & Strack, 1993; Strack, et al., 1988). It is shown that inducing emotion-specific body postures, just like facial expressions, have emotion-specific effects (Duclos, et al., 1989; Flack, et al., 1999). Furthermore, people are not necessarily aware of how induced muscle contractions affected emotional experiences. When participants rated the humor intensity of cartoons while holding a pen between the teeth – facilitating smiling – they rated the cartoons as

funnier than while holding a pen between the lips – inhibiting smiling (Strack, et al., 1988). In the nineteenth century, James (1890) proposed that bodily sensations, like heart beat and muscle contractions, could precede cognitive emotional appraisals, and are fundamental to the emotional experience itself. We do not tell ourselves consciously that we have to run away from a bear, we just run and feel afraid. Renewed interest in how the body's actions feed back to cognitive processes or experiencing emotions has arisen since theories about embodied cognition have emerged. According to embodiment theories, actions, emotions and perceptions are the core building blocks of information processing (Barsalou, 1999; Damasio, 1989; Gallese & Lakoff, 2005; Glenberg, 1997). Concrete physical experiences underlie our understanding of abstract concepts (Niedenthal, 2007; Niedenthal, Eelen, & Maringer, in press). Imagining, thinking of or observing an object, an emotion or an action reactivates the same neural states that were active during the initial experience. This can explain why body postures experienced at the time of decision making are integrated in subsequent thoughts and emotions. For example, stepping backward increases an associated mindset like perspective taking (Koch, et al., 2009), and adopting a posture of fear, anger or sadness induces similar feelings (Duclos, et al., 1989). Experiencing a body posture or movement can facilitate, for example, emotion processing (Niedenthal, et al., 2009), language processing (Glenberg & Kaschak, 2002), object processing (Tucker & Ellis, 1998) and recall of similar experiences (Dijkstra, Kaschak, & Zwaan, 2007; Parzuchowski & Szymkow-Sudziarska, 2008).

Interestingly, social power is also associated with nonverbal behavior, like making a fist or having an expanded body posture (Carney, et al., 2010; Schubert, 2004). We use the term social power throughout this paper as an umbrella to refer to the vertical dimension of interpersonal relationships including (socio-economic) status, authority, prestige, respect, power, and dominance (Hall, et al., 2005). Note that, in this paper, we focus on subjective feelings of power. In the next section we describe how different

nonverbal behaviors, and arm crossing in particular, are related to perceptions and actual experiences of social power.

Nonverbal displays of power

Despite the wide interest in the nonverbal displays of social power (Dovidio & Ellyson, 1985; Henley, 1977), there is very little consensus about the behaviors that robustly reveal power (for an overview, see Hall, et al., 2005). Whereas some studies (e.g., Aguinis, Simonsen, & Pierce, 1998; Keating, Mazur, & Segall, 1977; Knutson, 1996) have focused on power perceptions, or the beliefs and stereotypes people have about power behaviors, other studies have investigated actual differences in nonverbal behavior of individuals who feel powerful or powerless (e.g., Aries, Gold, & Weigel, 1983; Dovidio, Ellyson, Keating, Heltman, & Brown, 1988; Gifford, 1991). Hall and colleagues (2005) summarized research findings from 1961 to 2002 about power perceptions (120 studies) and actual power displays (91 studies). Their meta-analysis showed that powerful individuals are believed to gaze more, raise eyebrows less, touch themselves less but others more, make more arm and hand gestures, have a tenser, more erect or forward posture, and stand closer to others than powerless individuals. In contrast to this abundance of findings, when looking at actual power displays, it was only found that powerful people have a more open body posture and interacted with smaller distance to others.

Recently, body openness has successfully been manipulated to create powerful and powerless states in people (Carney, et al., 2010; Huang, et al., 2011). The open and expansive body posture that was associated with power had people (participants or confederates) sit with one arm on the armrest of their chair and the other arm on the back of a nearby chair. Additionally, they crossed their legs such that the ankle of one leg rested on the thigh of the other leg and stretched beyond the edge of the chair they sat in. In the constricted, closed posture, associated with being powerless, they sat slightly

slouched with their legs together and their hands in their lap (Tiedens & Fragale, 2003). In comparison with the closed posture, for participants in the expansive posture, power was activated implicitly (as measured by the number of created power words in a word-completion task) and explicitly (by a self-report of power) (Huang, et al., 2011). Carney and colleagues (2010) asked participants to hold expansive poses (i.e., powerful posture: one relaxed sitting posture, leaning backwards, with arms clasped behind the head with elbows out, and legs up on a table, and one standing posture leaning forward with hands on the table), or constrictive poses (i.e., powerless posture: one standing posture with arm wrap and legs crossed, and one slightly slouched sitting posture with legs slightly open, bowed head, shoulders downwards and hands in lap). They showed that these postures induced neuroendocrinal and behavioral changes in power. Adopting high (vs. low) power postures increased (vs. decreased) participants' testosterone level, decreased (vs. increased) their cortisol level and led to more (vs. less) risk taking.

The effect of arm crossing in relation to power, as we wish to study here, has not often been studied in isolation. In other studies, together with other nonverbal behaviors, it has been classified as (reversed) postural openness (Carney, et al., 2010; Hall, et al., 2005), but also as hand/arm gesture (Carney, Hall, & Smith LeBeau, 2005; Gifford, 1994). Rated on the overarching level of openness, it was found twice that postural openness is related to higher levels of power. This could indicate that arm crossing is associated with lower power. Together with other hand and arm gestures, Carney et al. (2005) did not find significant results. To the best of our knowledge, only Gifford (1994) reported a result that could be attributed solely to arm crossing. Participants' nonverbal behavior during a 15minute small group interaction, was coded extensively. Participants completed a personality questionnaire, and observers were asked to do the same basing themselves on the mute video of the participants. By doing so, Gifford could analyze to what extent individuals and observers take into account different nonverbal behaviors to judge their personality. He found that frequency of arm

crossing was negatively correlated with dominance/ambition perceptions by others and positively with submission/laziness perceptions by others. However arm crossing was not associated with participants' own perceptions of dominance or submission. Only extraversion was negatively correlated with arm crossing, both for self-perceptions and other-perceptions.

Whereas these findings suggest that arm crossing may be associated with low levels of power, the meta-analysis by Hall and colleagues (2005) showed that often the findings for main effects of nonverbal behavior on power were very heterogeneous. For example, although overall evidence was found for a negative association between power and postural relaxation, five reported studies in the analysis showed significantly less postural relaxation for powerful individuals, whereas three studies showed significantly more relaxation for powerful individuals. Hall et al. argue that contextual moderators may be important to interpret the impact of nonverbal postures on feelings of power. It is not unlikely that for someone being nervous and polite an erect body posture is considered a sign of low power, whereas for someone who is proud and confident the same erect posture may signal high power. Wide categories of nonverbal behaviors (like smiling) are not unidirectionally related to how people feel. For example, a duchenne smile (with wrinkling eyes) reveals a smile of enjoyment, whereas a "false" smile without any eye wrinkles may mask discontentment (Ekman, Davidson, & Friesen, 1990; Ekman & Friesen, 1982). Hall et al. (2005) highlight the need to specify the meaning of nonverbal behaviors. In relation to contextual factors or inner states, different functions of one body posture can explain discrepancies in association with power. Arm crossing has been associated with defensiveness, but also with vigilance and unyielding (Argyle, 1988; Bull, 1987). We try to reconcile these functions, by investigating the different impact of this body posture for individuals with different inner states. We study the impact of arm crossing for individuals who differ in self-esteem.

Self-esteem

In general self-esteem can be defined as the degree to which we evaluate ourselves positively or negatively. Not only do high self-esteem individuals evaluate themselves more positively – for instance, in terms of popularity and attractiveness – than low self-esteem individuals do, but they also seem to do better in life than low self-esteem individuals. For example, people who have high self-esteem, persist longer when facing failure, promote initiative, have fewer eating disorders, and tend to perform better at school (for an overview of self-esteem effects, see Baumeister, Campbell, Krueger, & Vohs, 2003). For years, it has been suggested that high self-esteem is related to well-being and is therefore in itself worth striving for. However, high self-esteem does not seem to be the cause of major successes in life, but rather fluctuates together with achievements and failures. Sociometer theory explains when and why shifts in self-esteem may occur by framing self-esteem as an internal monitor that signals how others perceive us (Leary, 1999; Leary, Tambor, Terdal, & Downs, 1995). It is argued that people need to observe to what extent they belong to their social group or risk to get excluded. Feelings of low self-esteem alert the danger of social exclusion and help people change behavior in order to remain accepted within the social group. If self-esteem is used as a means to check one's position in a social group, we believe it is interesting to explore how arm crossing informs people with different levels of self-esteem about their social power. In the next section, we propose how two different meanings of arm crossing, namely being defensive and unyielding, can be associated with different levels of self-esteem and have an impact on social power and resistance to external influences.

Hypothesis development

Whereas most research suggests that arm crossing is associated with experiencing low power (Hall, et al., 2005), the body posture has also been suggested to have more

specific meanings, like expressing defensiveness or not giving way to pressure or persuasion (Argyle, 1988). As arm crossing is an ambiguous body posture that can both be linked to feelings of being powerful and powerless, we argue that arm crossing will have a different impact on people's behavior and mindset dependent on prior feelings of self-esteem. People with higher self-esteem have a more internal locus of control than people with lower self-esteem (Judge, et al., 2002). If high self-esteem individuals are "internals" who believe that the behaviors they undertake are effective in reaching a goal, arm crossing may most likely activate the meaning of unyielding, and increase individuals' feelings of power in comparison with adopting a neutral posture. On the other hand, for low self-esteem people, who tend to have an external locus of control, lack self-confidence, and do not expect their behaviors to be successful in reaching a goal, arm crossing may activate the meaning of acting defensive or being vulnerable, and decrease feelings of power in comparison with adopting a neutral posture.

H1: In comparison with a neutral posture, arm crossing heightens power for individuals with high self-esteem

H2: In comparison with a neutral posture, arm crossing lowers power for individuals with low self-esteem

In addition to a differential impact on feelings of power, we hypothesize that arm crossing will change the extent to which low and high self-esteem individuals rely on contextual information. Powerful individuals think more abstractly (Smith & Trope, 2006). They go beyond exact details of a situation, look at the core aspects of the task and may be less context-dependent. Indeed, powerful individuals were less influenced by both social and nonsocial situational cues than powerless individuals (or individuals in a baseline condition) when, for instance, generating ideas or expressing opinions (Galinsky, Magee, Gruenfeld, & Whitson, 2008). Also, internal locus of control increases psychological reactance against external influences, whereas external locus of control

increases conformity with persuasion attempts by others (Biondo & MacDonald, 1971). Taken together, if arm crossing induces the feeling of being powerless for low self-esteem individuals, it may increase reliance on situational cues. On the other hand, as arm crossing may activate feelings of bein powerful for high self-esteem individuals, it may decrease reliance on situational cues.

H3: In comparison with a neutral posture, arm crossing decreases context-dependency for individuals with high self-esteem

H4: In comparison with a neutral posture, arm crossing increases context-dependency for individuals with low self-esteem

Before turning to a pilot study in which we explore perceptions of arm crossing, and a first behavioral study in which we test these hypotheses, we highlight that gender differences exist in nonverbal displays of power. Therefore we believe it is important to take into account the potential impact of gender on our research findings.

Gender differences in nonverbal displays of power

The impact of gender on power displays has been studied frequently (Dovidio, et al., 1988; Halberstadt & Saitta, 1987; Henley, 1977; Schubert, 2004). Henley (1977) stated that natural differences between men and women in nonverbal behavior reflect differences in power displays, with nonverbal behavior of men being equal to high power poses and nonverbal behavior of women being exemplar for low power poses. Although Henley's theory has been very impactful and widely been cited, many researchers have casted doubt on her propositions (Dovidio, et al., 1988; Halberstadt & Saitta, 1987; Hall & Friedman, 1999). For example, in studying gaze during listening and speaking, Dovidio et al. (1988) have demonstrated that men and women with equal power did not differ in their behaviors. Only if no clear power difference with the interaction partner was perceived, women had the tendency to show low power displays (looking more while

listening than while speaking) and men acted like having high power (looking more when speaking, and looking less while listening). Hall and Friedman (1999) found robust gender differences in nonverbal displays that did not disappear when controlling for status. Additionally, high status was displayed differently by men and women, with women being more open and supportive in their nonverbal behavior than men. Even though this overview is far from conclusive, it pinpoints that we need to consider the possible impact of gender differences in nonverbal displays of power. Indeed, Schubert (2004) found that making a fist, associated with bodily force, activated the concept of power for men and women. However, it induced hope for control in men and reduced hope for control in women.

In line with Henley's theory (1977) and Schubert's findings (2004), the effect of gender could parallel the effect of self-esteem: When men cross arms in front of the body, they may feel more powerful; on the other hand, when women cross arms, they may feel less powerful. Alternatively, in line with Hall and Friedman's findings (1999), it could be that crossing arms is not associated with displaying power for one of both genders. This would mean that our proposed pattern of results could be absent for men or women. Gender is included in analyses to explore these suggestions.

Perceptions of arm crossing in a sales context

We performed a pilot study to find out if consumers consider arm crossing a good or bad posture to adopt when being persuaded. We asked people to imagine that a sales person would try to convince them to buy a product they did not plan on purchasing. Subsequently we asked them to choose which of two postures they would prefer to adopt while listening to the sales person. Participants could choose between two pictures of a person (matched in gender), one where the person, in an upright posture, was holding the arms neutrally next to the body and one where the person was crossing the arms in front of the body. A large majority of participants chose the picture of the person

crossing the arms (77%, $\chi^2(N=83) = 24.40$, $p < .0001$). Gender did not affect this distribution (Women: 73%, Men: 80%, $\chi^2(N = 83) = .60$, $p = .44$). Level of prior self-esteem ($\alpha = .88$) (Rosenberg, 1965) did not affect the likelihood of choosing the crossed arms posture (Wald $\chi^2(1) = .02$, $p = .90$). Although it is difficult to draw firm conclusions from a null finding, these data suggest that people with low self-esteem are equally likely as people with high self-esteem to cross their arms in front of their body when experiencing a persuasion attempt. People, no matter their feelings of self-worth, seem to have a lay theory dictating that crossing the arms could potentially protect themselves from external influences. To move beyond perceptions and explore the impact of arm crossing on how people behave, we conducted a behavioral lab study to test our hypotheses.

STUDY 1

In this study we measure initial feelings of self-worth and manipulate body posture of participants (arm crossing vs. neutral) to find out if inner states would lead to different appraisals of arm crossing on feelings of social power and its behavioral consequences. We measured power by means of a self-report and we assessed context-dependency with a cognitive task. We propose that arm crossing will lower power for individuals with low self-esteem and heighten context-dependency, but heighten power for individuals with high self-esteem and lower context-dependency.

Method

In return for partial course credit, 53 business students (28 women) were invited individually in the lab. First, we measured participants' self-esteem by the Rosenberg scale (Rosenberg, 1965) and by the single item scale "I have high self-esteem" (Robins, et al., 2001) (on 7-point items ranging from 1 *"Totally don't agree"* until 7 *"Totally agree"*). Next, participants were asked to take part in a marketing test about ergonomic chairs.

This cover story has been used before to manipulate body postures without any reference to the emotional states they induce (Huang, et al., 2011). The test required participants to sit in a fixed posture for about three minutes. In the "crossed arms condition" participants were instructed to sit straight against the back of the chair and cross their arms in front of their body. In the "neutral condition" participants also had to sit straight against the back of the chair, but they were asked to hold their arms loose to the side of their body. Figure 3.1 visualizes both postures. The experimenter told participants that questions about the ergonomic chair would follow after the test phase. During the test phase the experimenter was present in the room to make sure that the participant adopted the right posture. Subsequently, participants rated how comfortable the chair was, and how comfortable, easy and tiring it was to hold the posture (on 7-point scales ranging from 1 "*not at all*" to 7 "*very*"). Following this, in seemingly unrelated tasks, we measured mood by an ad hoc one item scale ("*How do you feel at this moment*", scored from 1 "*very negatively*" to 7 "*very positively*") and perceived power by assessing the Scales A (dominance, α = .49) and I (submission, α = .53) of the Wiggins (1979) Interpersonal Adjective Scale (IAS). The last task for participants was the framed-line test (Kitayama, Duffy, Kawamura, & Larsen, 2003). On each page of a leaflet, two different sized squared frames were printed, one with a vertical line hanging from the top in the middle and one empty square. In five trials, we asked participants to draw a line in the empty square of which the length was identical to the length of the line in the first square. With this absolute length task, it is possible to capture the extent to which people ignore contextual information. People who are more accurate in copying the absolute length of the printed line, are better in ignoring the different sizes of the squared frames and hence less context-dependent. Finally, participants were thanked and debriefed.

Figure 3.1. Body postures in Study 1: arm crossing vs. neutral posture.

Results

For each participant, we measured the deviation of the drawn lines from the printed lines (in millimeters) and calculated the average error as a measure of context-dependency. Higher scores indicate larger context-dependency. Because it is possible that longer printed lines lead to larger deviations, we also calculated the percentage of error in function of the length of the printed lines. All analyses were performed with the absolute error and with the percentage error. Since no differences emerged, we report results with the absolute error. Due to technical problems, the self-esteem scores on the Rosenberg scale could not be used. However, as we also assessed self-esteem by means of the validated one-item scale developed by Robins et al. (2001), we continued working with this measure.

To start with, we standardized all continuous measures. Next, we calculated a Mahalanobis distance (within each posture condition) for each participant (based on the correlation between self-esteem and average error) to determine outlying participants (Mahalanobis, 1936; Zijlstra, van der Ark, & Sijtsma, 2011). One participant was identified as an outlier, having a distance higher than the .99 fractile in the Chi-square distribution ($df = 1$), and was excluded from further analyses.

Mood. Mood did not differ between posture conditions ($F(1, 51) = .07$, $p = .80$). Additionally, a GLM analysis on mood with posture and self-esteem as independent variables did not result into significant main or interaction effects on mood (all ps > .21).

Chair and posture ratings. Posture did not affect the ratings of chair comfort ($F(1, 51) = .43$, $p = .52$) and posture comfort ($F(1, 51) = .06$, $p = .80$). However, crossing arms was rated more tiring ($M = 2.77$, $SD = 1.39$) than holding the neutral posture ($M = 2.08$, $SD = 1.09$; $F(1, 51) = 3.97$, $p = .05$). Additionally, there was a marginal significant effect of posture on ease of holding the pose, with the neutral posture being easier ($M = 4.85$, $SD = 1.46$) than crossing arms ($M = 4.15$, $SD = 1.46$; $F(1, 51) = 2.92$, $p = .09$). When we performed separate GLM analyses with posture and self-esteem as independent variables and each of the ratings as the dependent variable, we found no main effects of self-esteem (all ps > .34) or interactions (all ps > .28) and the main effects of posture remained largely the same. To make sure that our results are not driven by differences in ease or fatigue in holding postures, we control for these variables in all further analyses. However, controlling for ease or fatigue did not change the pattern of results.

Gender. Gender did not affect feelings of power ($p > .20$) or degree of context-dependency ($p > .74$). In the findings we report below, adding gender as a covariate, or allowing for a three-way-interaction between gender, posture and self-esteem, its main effect, or interactions with posture and self-esteem never reached significance nor did it change the pattern of results.

Perceived power. We conducted a GLM analysis on perceived power (aggregate of A and I scale, $\alpha = .67$) with posture and self-esteem as independent between-subject variables, and controlling for ease and fatigue of posture. The main effects of posture, ease and fatigue were not significant (all ps > .27). We found a main effect of self-esteem ($\beta = .83$, $F(1, 46) = 10.50$, $p = .002$), indicating that participants with low self-esteem (M - 1SD) felt less powerful ($M = -.43$, $SE = .18$) than participants

with high (*M* - 1*SD*) self-esteem (*M* = .39, *SE* = .18). Most importantly however, the expected interaction between posture and self-esteem was close to significance ($F(1, 46) = 3.81$, $p = .06$). By means of slopes and simple effects analyses, we took a closer look at the predicted pattern of interaction (see Figure 3.2). As expected, people with high self-esteem (*M* + 1*SD*) felt more powerful when crossing arms (*M* = .78, *SE* = .24) than when posing in a neutral posture (*M* = .002, *SE* = .28; $t(51) = 2.11$, $p = .04$). Although we expected the opposite pattern for people with low self-esteem (*M* - 1*SD*), namely that crossing arms made these participants feel less powerful than being in a neutral posture, the difference was not significant ($M_{crossed} = -.54$, $SE_{crossed} = .25$; $M_{neutral} = -.33$, $SE_{neutral} = .25$; $t(51) = -.58$, $p = .60$). Importantly however, we found that the differential effect of self-esteem on power occurred for participants who crossed arms ($\beta = 1.32$, $t(51) = 4.06$, $p = .0002$), but not for participants in the neutral posture ($\beta = .33$, $t(51) = .85$, $p = .40$). Because perceived power relies on a self-report of feelings, and people with low self-esteem may be reluctant to report a lack of power, it may be a conservative test of our hypothesis. Hence, we turn to behavioral data, provided by the framed-line test, to find out if a more pronounced pattern of results is obtained.

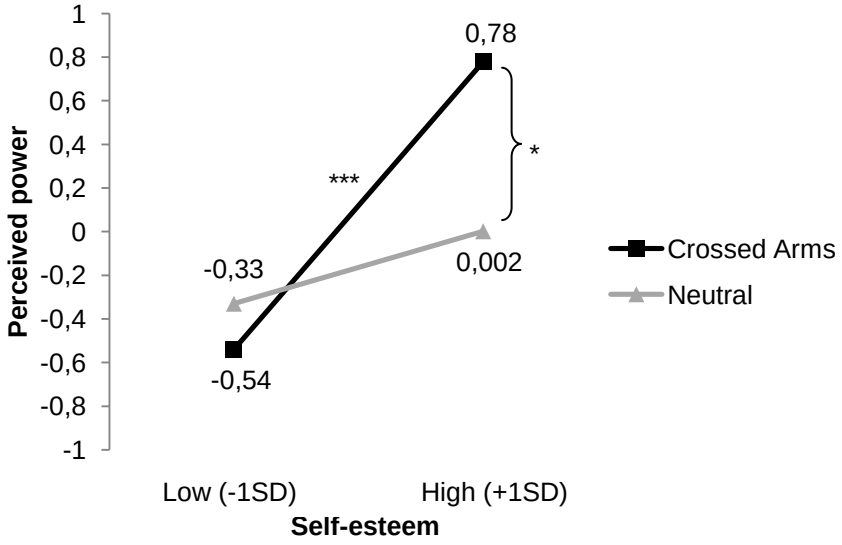

Figure 3.2. Power as a function of posture and prior self-esteem.
Note. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Average error. Again, we executed a GLM analysis with posture and self-esteem as independent between-subject variables, and controlling for ease and fatigue of posture to explain the variance in context-dependency. The main effects of posture, self-esteem and fatigue were not significant (all *p*s > .35). The main effect of ease was significant (β = -.95, $F(1, 46) = 8.91$, $p = .005$). Participants who rated the posture easy to carry out (M + 1SD) made fewer errors (M = 3.01, SE = .22) than participants who rated it as difficult (M - 1SD) (M = 3.97, SE = .22). In line with our predictions we found a significant interaction between posture and self-esteem ($F(1, 46) = 12.62$, $p = .0009$) (see Figure 3.3). Simple effects analyses revealed that with arm crossing low self-esteem individuals became more context-dependent (M = 4.15, SE = .31) than in a neutral posture (M = 3.12, SE = .32; $t(51) = 2.29$, $p = .03$). The opposite pattern was present for high self-esteem individuals. Arm crossing made these individuals less context-dependent (M = 2.73, SE = .29) than a neutral posture (M = 3.95, SE = .35; $t(51) = -2.64$, $p = .01$). Focusing on the effect of each posture, we found that when crossing the arms, greater self-esteem makes people less context-dependent (β = -1.42, $t(51) = -3.49$, $p = .001$), whereas in a neutral posture, only a marginal, opposite, effect emerged (β = .83, $t(51) = 1.70$, $p = .10$) suggesting that greater self-esteem leads to slightly more context-dependency.

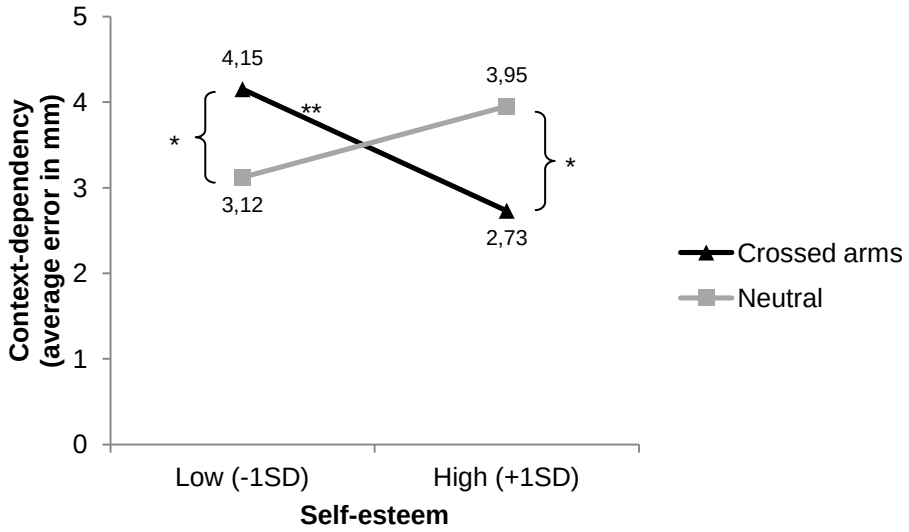

Figure 3.3. Context-dependency as a function of posture and prior self-esteem.
Note. $^{*}p < .05$, $^{**}p < .01$

Mediated moderation. So far, we found that arm crossing together with higher levels of self-esteem made individuals less context-dependent and feel more powerful. To test if the moderation of self-esteem and posture on context-dependency is mediated by power, we executed a mediated moderation analysis. When adding perceived power as an additional variable to a GLM analysis on context-dependency with posture and self-esteem as independent between-subject variables, and controlling for ease and fatigue of posture, we found that the interaction of posture with self-esteem had a reduced, but still significant impact (p = .006). The main effect of power was significant ($F(1, 45) = 6.80$, $p = .01$), with powerful individuals being less context-dependent ($M_{power + 1SD} = 3.03$, $SE = .23$) than powerless individuals ($M_{power - 1SD} = 3.93$, $SE = .22$). These findings suggest that power partially mediates the moderating effect of posture by self-esteem on context-dependency. Furthermore, individuals who rated the posture easier to hold, were less context-dependent ($M_{ease + 1SD} = 3.07$, $SE = .21$) than those who rated it more difficult ($M_{ease - 1SD} = 3.89$, $SE = .21$) ($F(1, 45) = 7.32$, $p = .01$). All other effects were insignificant ($ps > .21$). To formally test the predicted pattern that the indirect effect of self-esteem on context-dependency through power was significant when participants crossed their

arms, but not when they were in a neutral posture – see Figure 3.4 for a visualization – we made use of the modmed procedure in SPSS (Preacher, Rucker, & Hayes, 2007). As expected, the conditional indirect effect for the crossed arms condition was significant (z = -2.15, p = .03), whereas it was not for the neutral condition (z = -.76, p = .45). Taken altogether these findings suggest that crossing the arms in front of the body boosts (lowers) individuals' feelings of power when having high (low) self-esteem and thereby impacts context-dependency. However, as already indicated by the analyses on power, when formally testing the effect of arm crossing vs. the neutral posture through power on context-dependency for low and high self-esteem individuals, we find that power mediates the effect of body posture on context-dependency for high self-esteem individuals (indirect effect tested with 1000 bootstraps, 95% CI = [-.97, -.03]), but not for low self-esteem individuals (1000 bootstraps, 95% CI = [-.16, .58]).

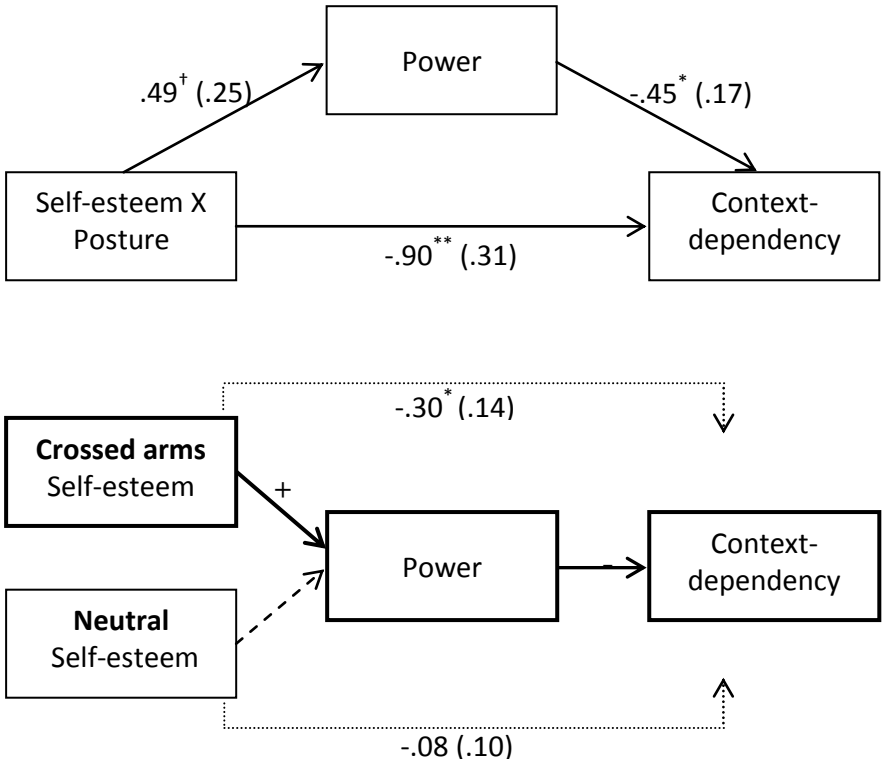

Figure 3.4. Outline of mediated moderation.
Arm crossing alters perceived power as a function of initial feelings of self-esteem, and, as a consequence, context-dependency, whereas a neutral posture does not affect power or context-dependency.
Note. Numbers indicate coefficients, numbers between brackets indicate standard errors. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$, **** $p < .0001$.

DISCUSSION

In this research we investigated the impact of arm crossing on feelings of social power. Recently it was found that body postures can influence feelings of power, such that expanded postures led to higher feelings of power than constricted body postures (Carney, et al., 2010). Literature suggests that the body posture of arm crossing is associated with low power (Gifford, 1994; Hall, et al., 2005). However, more specific functions have been appointed to this body posture. It has been associated with being defensive and unyielding (Argyle, 1988; Bull, 1987). Because arm crossing seems an ambiguous body posture that can be associated with vulnerability, but also with being in control of a situation, we proposed that this posture could have different meanings for people dependent on their dispositions. We suggest that individual differences in self-esteem could explain whether people associate the posture with successful (and hence feeling powerful) or unsuccessful protection against external influences (i.e., feeling powerless). Feelings of self-esteem are used in an interpersonal context to monitor how others perceive us (Leary, et al., 1995). Nonverbal cues like arm crossing could be added to this monitoring process and guide us in how to behave. Higher self-esteem is associated with feelings of self-efficacy and a more internal locus of control (Judge, et al., 2002). In contrast to low self-esteem individuals, high self-esteem individuals believe they are in control of their own actions to manipulate the course of events. Therefore the posture of arm crossing may be more related to unyielding for high self-esteem individuals, but more related to acting defensive for low self-esteem individuals. Hence, arm crossing may (re)activate these respective feelings.

In a first study we found that the impact of arm crossing on feelings of power was moderated by levels of self-esteem. Arm crossing makes self-confident individuals feel more powerful than unconfident individuals. In comparison with a neutral posture, self-confident participants who posed with crossed arms considered themselves more

powerful. Although we expected to find the opposite pattern for less confident participants, i.e., lowered feelings of power, we did not find significant differences between arm crossing and a neutral body posture. This could be due to the fact that feelings of power were measured by means of a self-report. It is possible that low self-esteem individuals were reluctant to report very low levels of power.

However, we did not only assess self-reports if power, but also conducted the framed-line task, a behavioral measure of context-dependency. Powerful people are more abstract thinkers and are better in focusing on the central aspects of a task (Smith & Trope, 2006). They are less influenced by situational cues when making decisions (Galinsky, et al., 2008). As we expected, we showed that, in comparison with a neutral posture, arm crossing lowered context-dependency for high self-esteem individuals, whereas it heightened context-dependency for low self-esteem individuals. This pattern was mediated by perceived power. Self-esteem and context-dependency were negatively related through feelings of power for arm crossing, but not in a neutral posture. These findings indicate that arm crossing can have different meanings dependent on one's associations with that bodily state. Note however that in comparison with the neutral posture, we did find a stronger impact of arm crossing on high self-esteem individuals (i.e., increased power) than on low self-esteem individuals (i.e., decreased power). This in itself is an interesting finding, because in the past arm crossing has mostly been associated with feelings of low power.

We did not find any effects of gender. Gender did not mimic the moderating effect of self-esteem on arm crossing interpretation. Unlike Schubert's findings (2004) that making a fist lowers power for women and heightens power for men, our findings suggest that arm crossing has similar functions to both men and women.

Interestingly, the performance in the absolute framed-line test is related to interpersonal influence and adjustment (at least in Western cultures) (Miyamoto &

Wilken, 2010). The less people are context-dependent, the more they assert the self and think they can change others. Larger errors, or heavier context-dependency, indicate that people suppress themselves more and conform to other. We also pointed to the fact that self-esteem is associated with locus of control (Judge, et al., 2002). Locus of control in its turn affect degree of conformity to external influences (Biondo & MacDonald, 1971). Therefore, in future research we could test more explicitly if arm crossing has an impact on persuasion, and whether this impact depends on levels of self-esteem.

We performed a pilot study to find out if consumers consider arm wrap a good or bad posture to adopt when being persuaded. We found that people believe that arm crossing can protect them from being persuaded by a sales person. However in a behavioral lab study we demonstrate that people with low self-esteem may not benefit from this strategy. As we have shown, arm crossing elicits feelings of being powerless for unconfident people. As a consequence it may be easier to persuade them, as they adopt an arm wrap posture. More generally, it would also be interesting to investigate different effects of context-dependency in consumer settings. Anchoring effects (Tversky & Kahneman, 1974), the attraction and compromise effect (Simonson, 1989) should increase for unconfident individuals who cross arms.

Two routes through which the motor system can influence the affective system have been assumed (Neumann & Strack, 2000). On the one hand, people can consciously interpret their perceived bodily sensations as indicative for the feelings they hence must have (Buck, 1980; Laird, 1974). On the other hand, as individuals are not necessarily aware of how induced muscle patterns affect emotional experiences (e.g., Strack, et al., 1988), there is evidence for a more direct path from the motor system to the affective system, suggesting that cognitive attribution is not a necessary mediator of effects found. In Study 1, we made use of a between-subjects design to manipulate body

postures. This made it less likely that participants were aware of the power manipulation and could consciously attribute arm wrap to self-perceptions of power.

There are several limitations to the study that we have conducted that need to be addressed in follow-up research. Self-esteem was measured as a trait, but can also be manipulated, for example by providing bogus feedback about one's personality (Greenberg, et al., 1992). We have studied one isolated movement, whereas often nonverbal behaviors occur in patterns. Hence, our test was a conservative one, making a strong point for the strength of arm crossing as a meaningful nonverbal cue in and by itself. However, it could be that in natural circumstances, arm crossing that communicates defensiveness go along with a more constricted body posture, whereas arm crossing that communicates unyielding may be combined more frequently with an expanded body posture. It would be interesting to have people pose with their arms crossed, and analyze if body expansiveness covaries with self-esteem. If this is the case, then body expansiveness may be a good signal for interpreting the function of arm crossing at a given point in time.

Finally in future research we could investigate more specifically whether arm crossing is associated with different prior experiences of low and high self-esteem individuals. We speculate that the meaning of defensive arm crossing may result from unsuccessful protection against external influences in the past, whereas the meaning of unyielding may result from successful protection against external influences in the past, or even successful persuasion attempts of oneself. These different experiences could correlate with feelings of self-esteem. To investigate this reasoning, we could adapt an experimental design of Dijkstra et al. (2007) to have people think back about autobiographic (successful and unsuccessful) persuasion attempts by others in a neutral posture or with arms crossed. If self-esteem is manipulated prior to this task, then we expect low self-esteem to be congruent with arm crossing and thinking back about

successful persuasion attempts by others, whereas high self-esteem should be congruent with crossing arms and thinking back about unsuccessful persuasion attempts by others. Congruence should then facilitate memory recall, whereas incongruence should inhibit recall. Alternative explanations for the differential impact of arm crossing on feelings of power and context-dependency should be explored. For instance, it could be that arm crossing does not have different meanings, like unyielding and being defensive, but rather one meaning that consolidates habitual patterns of thinking and behaving. For instance, arm crossing could increase interpersonal distance, and as a consequence, heighten focus on the self and make people act and think more in line with their dispositions.

Our research contributes to literature about nonverbal behavior and embodied cognition in that it shows that one body posture can have very opposite effects on cognition and behavior for different people. It should be explored further why perceptions about the meaning of arm crossing and its actual effects on behavior differ, as these differences have large consequences on how people behave in an interpersonal context.

GENERAL DISCUSSION

In three essays we explored the situated and embodied nature of consumer behavior. We showed that bodily movements and postures influence how consumers think and evaluate products. However, the concrete underlying theoretical processes in the three essays were different. Here I summarize our findings, and look forward to the future by discussing the limitations, and touching upon open questions, as yielded by our research.

ESSAY 1

In essay 1, we investigated how ease of grasping products affects consumers' preferences. For right-handers it is easier to grasp products with handles oriented rightwards than leftwards. The opposite is true for left-handers, who prefer manipulating products with the left hand. If people have a preference for products oriented in a way that they can easily interact with them, this would speak to the idea that bodily actions impact decisions. We outlined two mechanisms through which feelings of ease can be experienced and impact preference construction. Experiencing fluency of action could result from a strong learned grasping pattern that fits well with how a product is oriented (i.e., a product handle oriented rightwards for someone who is used to grasping products with the right hand). We showed that right-handers who have a strong preference to manipulate objects with the right hand, find a product with its handle rightwards more attractive than one with its handle leftwards. However this automatic bodily driven effect only occurred when more conscious processing was inhibited. On the other hand, experiencing fluency can also follow from a situational fit between the body and the actions permitted by objects (i.e., handles oriented leftwards communicate acting with the left hand, whereas handles oriented rightwards trigger

actions with the right hand). More flexible right-handers have a preference for products oriented rightwards, and do so because they match environmental characteristics with what their body permits at the time of decision. This was demonstrated by showing that flexible right-handers pay more attention to orientation cues than rigid right-handers, flexible right-handers' preference shifted to products oriented leftwards when explicitly asked to make choices with the left hand whereas this did not affect rigid right-handers' decisions, and finally by showing that mental resources are needed for flexible right-handers in order to show an effect of ease of grasping.

One limitation of our research is that the findings seem restricted to products with handles. However, the effect of ease of mental simulation on preference construction could possibly be extended past these first results. It is for instance worth investigating if unwrapped products are more attractive and lead to higher purchase intentions than wrapped products of which the package depicts an image of the product. It could be easier to simulate product usage with unwrapped than with wrapped products. Additionally, this effect could be strongest for individuals who have a high need for touching objects (Peck & Childers, 2003).

Another limitation of our research is that we focused on right-handers, as they are the majority of the population. Forthcoming research by Elder and Aradhna (in press) that addresses the impact of mental simulations on purchase intentions included left-handers and found similar effects of ease of grasping, no matter handedness. However, their research did not make a distinction between strong and flexible left- or right-handers. Interestingly, also left-handers seem to differ in handedness flexibility (Gonzalez & Goodale, 2009). Thus, it would be interesting to see if our findings can be replicated for strong and flexible left-handers.

Based on our research it seems that more flexible right-handers incorporate situational cues more in their decision making processes. They paid more attention to

product handles than rigid right-handers did. Therefore, further research could explore if the difference in dexterity flexibility generalizes to more general differences in context-dependency. If flexible right-handers rely more heavily on situational cues, they might also do so for situational cues (e.g., incidental affect) that are unrelated to handedness and product manipulations.

The motor fluency effect for flexible right-handers involved the presence of sufficient mental capacity. This highlights that relying on mental simulations is not synonymous to superficial processing of product information. In line with these findings, in emotion processing research, it was found that reading words with an emotional valence (e.g., "vomit" or "happy") activated emotional facial musculature when participants processed the emotional meaning of the words, but did not so when shallowly processing nonemotional properties of the words, like letter case (Niedenthal, et al., 2009). Elaborating on these findings, we do not expect product orientation to impact consumers' choices when they are compare products explicitly by, for instance, price, which does not involve motor simulations. The focus of the decision strategy is one of the potential boundaries of the motor fluency effect that could be studied in future research.

One may wonder whether ease of grasping coincides with ease of imagining product usage. It is often suggested that mental simulations that occur during information processing and (more explicit) imagery speak to the same neural structures in the brain (e.g., Farah, 1989; Jeannerod, 1995). Functional actions with products are activated when confronted with pictures (Helbig, et al., 2006), hence it could be that explicitly imagining how to use a product is easier if grasping is facilitated, which in turn could lead to increased attractiveness. If imagery is similar to mental simulations, this may be an easy route to amplifying the effect, because in advertising, imagery can be triggered by simply adding phrases like "Picture yourself…". However, recently it has

been shown that action understanding activates motor regions in the brain that can be dissociated from motor regions that are active during action imagery (Willems, et al., 2010). Therefore it could also be hypothesized that inexplicit mental simulations of grasping would be overruled by explicitly asking participants to imagine how to use the products. Until now, it remains unclear whether the grasping fluency effect would amplify or disappear. The dissociation between simulations and imagery is an interesting avenue for further research.

ESSAY 2

Whereas in essay 1 we focused on preference construction as a result of the interaction between grasping tendencies of individuals and actions that are communicated by product handles, in essay 2 we investigated how trivial unusual actions affect decision making. Previous research has suggested that changes in life instigate openness to change (Wood, 2010). We made more specific predictions, and argued that engaging in novel behavior triggers an explorative mindset, making people more likely to discover their surroundings for new opportunities. We showed that performing an unusual action made people more likely to explore novel or uncommon choice alternatives. To fully test our predictions, we would like to conduct another study that distinguishes between variety seeking and novelty seeking. If unusual situations lead to exploration, we hypothesize that people would not just deviate from their favorite products and choose different but known products, rather they would be attracted by unknown alternatives. We would manipulate the unusualness of a situation and investigate, for example, purchase intentions for potato chips. Someone with a preference for sour cream and onion chips, should then show an increased preference for shrimp flavored chips (currently not on the market and hence novel) but not for ranch dressing flavored chips (currently on the market). This could strengthen our findings of

Study 4 in which conventional products were not tested. Now we can only speculate that our findings are due to the novelty of all tested items.

So far, our studies centered the attention on need for uniqueness. Need for uniqueness is a social dimension on which individuals can differ. In the context of consumer behavior, need for uniqueness is characterized by buying unusual or novel products or combining products in an uncommon way to express uniqueness in comparison to other consumers. We considered consumer need for uniqueness as an interesting instance of explorative behavior that is relevant to marketers. High uniqueness seekers tend to be interested in scarce or novel products, and care about customization more than low uniqueness seekers do. Therefore, stores in unusual places (e.g., in the airport), which may trigger exploration in consumers, could focus more on promoting customization of products, and uncommon sales offers. Nevertheless, we think it is important to further investigate the process that underlies uniqueness seeking and focus less on need for uniqueness as a phenomenon. We proposed that uncommon behavior leads to openness to new experiences or novelty seeking. Therefore in follow-up research we will test if the effect of unusualness on novelty seeking is mediated by an increased level of curiosity. Additionally, we expect the effect of unusualness on novelty seeking to be moderated by initial levels of openness to new experiences. Similar to our findings in Study 2, we anticipate that unusual actions will mainly boost purchase intentions for novel product options of individuals who are low novelty-seekers in general, because individuals who are chronically open to new experiences might always seek novelty.

In our studies we made use of two different manipulations of unusualness. First, for right-handers it is more unusual to perform actions with the left hand, than with the right hand. Second, making use of a large touch screen monitor is less usual than working with a computer mouse. Whereas both manipulations focused on actual unusual

behavior, we believe that our findings could be extended to experiencing uncommon situations without having participants undertake action. As stated above, a store in the airport may induce similar effects of exploration. Therefore we would like to replicate our findings by manipulating the unusualness of the situation (e.g., carrying a new type of shopping basket, sitting on a new type of chair) rather than the unusualness of actions.

Future research could also investigate if novel situations induce a mindset of novelty seeking or a goal to act in a novel way. If participants would continue to make novel choices after a first decision, this would suggest that novelty instigates a mindset of novelty seeking. On the other hand, if a second choice would reveal a return to favorite product options, this suggests that novelty leads to the temporary goal of acting novel or standing out of the crowd that can be satiated by making one explorative choice.

ESSAY 3

Research about embodied cognition has concentrated mostly on bodily effects in which one sensation is unilaterally linked to behavior or thinking (e.g., heavy is important, Jostmann, et al., 2009; or pushing away is aversive, Van den Bergh, et al., in press). In our last essay however, we showed that one body posture can lead to very dissimilar effects for different people. Crossing arms in front of the body can be associated with vulnerability, but also with power (Argyle, 1988). Dependent on people's dispositions, and experiences in life, arm crossing may activate one of both meanings. Because, higher self-esteem is related to a more internal locus of control (Judge, et al., 2002), we proposed that arm crossing triggers feelings of power for high self-esteem individuals, but defensiveness, or lack of social power for low self-esteem individuals. Additionally, powerful individuals think more abstractly (Smith & Trope, 2006) and

feeling in control makes people react against persuasion attempts by others (Biondo & MacDonald, 1971). Hence, we studied how different levels of self-esteem could lead to differences in reliance on contextual cues as a function of arm crossing.

We demonstrated that arm crossing increases power feelings and context-independency together with higher levels of prior self-esteem, whereas a neutral posture did not create such a difference. Differences between neutral and crossed arm posture were most pronounced for high self-esteem individuals: Individuals with high self-esteem felt more powerful and relied less on contextual cues than individuals with high self-esteem who adopted a neutral posture with the arms loose to both sides of the body. When crossing arms, people with low self-esteem felt less powerful than people with high self-esteem, but not more or less powerful than when adopting a neutral posture. However we did find that arm crossing led low self-esteem people to rely more heavily on contextual cues than in a neutral posture.

The finding that arm crossing impacts context-dependency, such that lower levels of self-esteem led to more context-dependent behavior leads to several interesting routes for further research. So far, context-dependency was tested by means of the framed-line test, a cognitive task (Kitayama, et al., 2003). It would be interesting to investigate different effects of context-dependency in consumer settings. Anchoring effects (Tversky & Kahneman, 1974), the attraction and compromise effect (Simonson, 1989) should increase for unconfident individuals who cross arms. Also, unconfident individuals who cross arms may be easier to persuade by a peer or even a sales person, than when in a neutral posture. If follow-up research suggests that some consumers are actually worse off when crossing arms, it should be highlighted that it is paradoxical that we found that people believe that arm crossing protects them from persuasion attempts. Therefore, it may be important to consider consumer welfare and see how people can be made conscious of these negative effects.

However, first of all it is important to try and replicate this effect. Next, we need to further investigate what drives the effect, and test possible alternative explanations for our results. We speculate that in interpersonal relationships low self-esteem people may associate arm crossing with unsuccessfully trying to protect themselves from persuasion attempts by others, whereas high self-esteem people may associate arm crossing with successfully overruling persuasion attempts by others. Hence, whereas arm crossing may induce feelings of being defensive for low self-esteem people, it may induce feelings of unyielding for high self-esteem people. In the general discussion of essay 3 we elaborate on one possible way of testing this hypothesis. Another possibility is that arm crossing leads to a similar impact on one variable that in its turn has a different impact dependent on one's self-esteem. For example, the effect may be driven by different interpretations of interpersonal distance. Arm crossing could enlarge interpersonal distance and increase focus on the self. Thereby it could make individuals with lower feelings of self-esteem feel less secure, and make individuals with high self-esteem feel more secure, self-confident and in control. It is important to test for this alternative hypothesis in follow-up research. One final alternative explanation for our results is that arm crossing with an erect body posture (as participants were seated with the back upright against the chair) is compatible with feeling confident, but incompatible with feeling insecure. If low self-esteem individuals were to sit with the arms crossed and with shoulders downwards, this may feel more comfortable and familiar and thereby induce heightened feelings of power. It is worth investigating a compatibility explanation of our findings, because embodiment research has for instance found that body postures only impacted decision making when valence of products and of body posture were in alliance (Förster & Strack, 1996).

THE FUTURE OF EMBODIED AND SITUATED COGNITION

As noted in the introduction and throughout our essays, recently researchers have regained interest in how the body affects decision making (for a review, see Barsalou, 2008). Simultaneously, researchers started focusing attention to the situated nature of cognition (Schwarz, 2006b). These were radical reactions against abstract cognitive theories which describe decision makers as constructing, activating and applying abstract symbolic representations (like schemas and prototypes in psychology, or utilities in economy) (Barsalou, 1999; Glenberg, 1997; Niedenthal, et al., 2005). In many different domains of research, it was stressed that higher order cognition does not take place in isolation of the outer world or the body. For example, preference construction and the usage of stereotypes depend highly on the situation (Bettman, et al., 1998; Smith & Semin, 2007). Researchers argue that it is adaptive to construe concepts online, with the situation providing interesting building blocks for facilitating information processing.

The past decade, a wealth of research findings have challenged classic views of abstract cognition and demonstrated that cognition is at least to some extent grounded in situations and physical experiences. Debate has started about the future of embodiment. In 2010, consumer researchers organized a preconference about embodied cognition at the annual North-American conference of the Association for Consumer Research. This was followed by a roundtable discussion at the same conference in 2011 where further directions for research on the role of embodiment in consumer behaviors are developed. I believe that some predictions that Barsalou (2010) put forward about the future of grounded cognition are important in advancing research about consumer behavior. First, we should go past demonstration studies about embodiment and situated cognition and have more developed theories on when and why situations or bodily influences affect consumers' decisions. This could tell us more about the adaptive

nature of flexible decision making. Also, by incorporating embodied and situated mechanisms into classic cognitive phenomena, like preference construction, contextual factors will become integral parts of enriched theories about consumer behavior. Finally, insights from developmental science, artificial intelligence and neuroscience will be indispensable to make progress in understanding consumers' minds. I would advocate our research agendas to become more multidisciplinary, and have different domains of research benefit from complementary expertise about grounded cognition.

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